

III. Suez Canal Authority

PART III. SUEZ CANAL AUTHORITY

1. Organization and Activities

1-1 Organization and Personnel

The Suez Canal is managed and operated by the Suez Canal Authority (hereinafter referred to as SCA).

SCA is a public organization having an independent legal status and its own budget. Most of the regulations of the Government which are applicable to public enterprises and private business firms do not apply to SCA, but SCA's annual budget must undergo the examination of the Ministry of Finance and the Ministry of Planning and be approved as prescribed by Presidential Decree.

The management of SCA is directed by the Board of Directors (organized with a Chairman and Directors); the Chairman concurrently assumes the Managing Directorship.

SCA has its head office in Ismailia and local offices in Port Said and Port Tewfik (Suez) for handling field works, and also a liaison office in Cairo.

The organization of SCA consists of 10 Departments and 4 offices which are directly responsible to the Chairman. Its organization chart is shown as Fig. 3-1-1.

At present, there are about 1,800 employees and about 10,200 workers with the SCA.

The number of employees and workers in each Department is shown in Table 3-1-1. Nearly half of the senior staff and employees are engineers.

Apart from the increase in the tug boat seamen and pilots contemplated for the Canal, no personnel reinforcement is scheduled for the present.

1-2 Management of the Canal and Other SCA's Activities

Main functions of SCA relating to the management of the Canal are the transit control in the Canal and the maintenance and improvement of the Canal and ports.

Vessels transiting the Canal organize convoys at Port Said or Suez, in accordance with the Rules of Navigation, the schedule set by SCA, and the directions of the SCA officials (harbour master, port officer, pilot, signalman etc.). When navigating in the two Ports and the Canal, they take on a SCA pilot for obtaining advice on manoeuvring. Operation of a convoy is controlled by the transit control office in Ismailia which receives information from 12 signal stations distributed along the Canal.

The maintenance work for the Canal consists mainly of maintenance dredging. In addition to the management of the Canal itself, equally important is the management of Port Said.

Being in a close relation with the transit control of the Canal, the management of this port has been treated on the unified basis.

Other activities which SCA is extending over the Canal zone cover a wide range of businesses, such as the management of Port Tewfik, provision of sweet water to Port Said, Ismailia and Suez, 3 cities located along the Canal, management of schools and hospitals, and operation of ferry services crossing the Canal. Further, SCA has affiliated companies which are engaged in the

shipbuilding, ship-repairing, port services and/or other businesses and to which SCA is extending investment, and jointventure operation or dispatch of a supervisor or director. These affiliated companies are:

- a) Shipbuilding and repairing
 - The Canal Naval Construction Co.
 - The Timsah Shipbuilding Co.
 - The Suez Shipyard Co.
- b) Ship repairing and metal processing
 - The Port Said Engineering Co.
 - The Canal Harbour Works Co.
- c) Rental of equipment and ship service
 - The Canal Company for Mooring and Searchlights.
- d) Production of Ship stores
 - The Canal Rope Co.

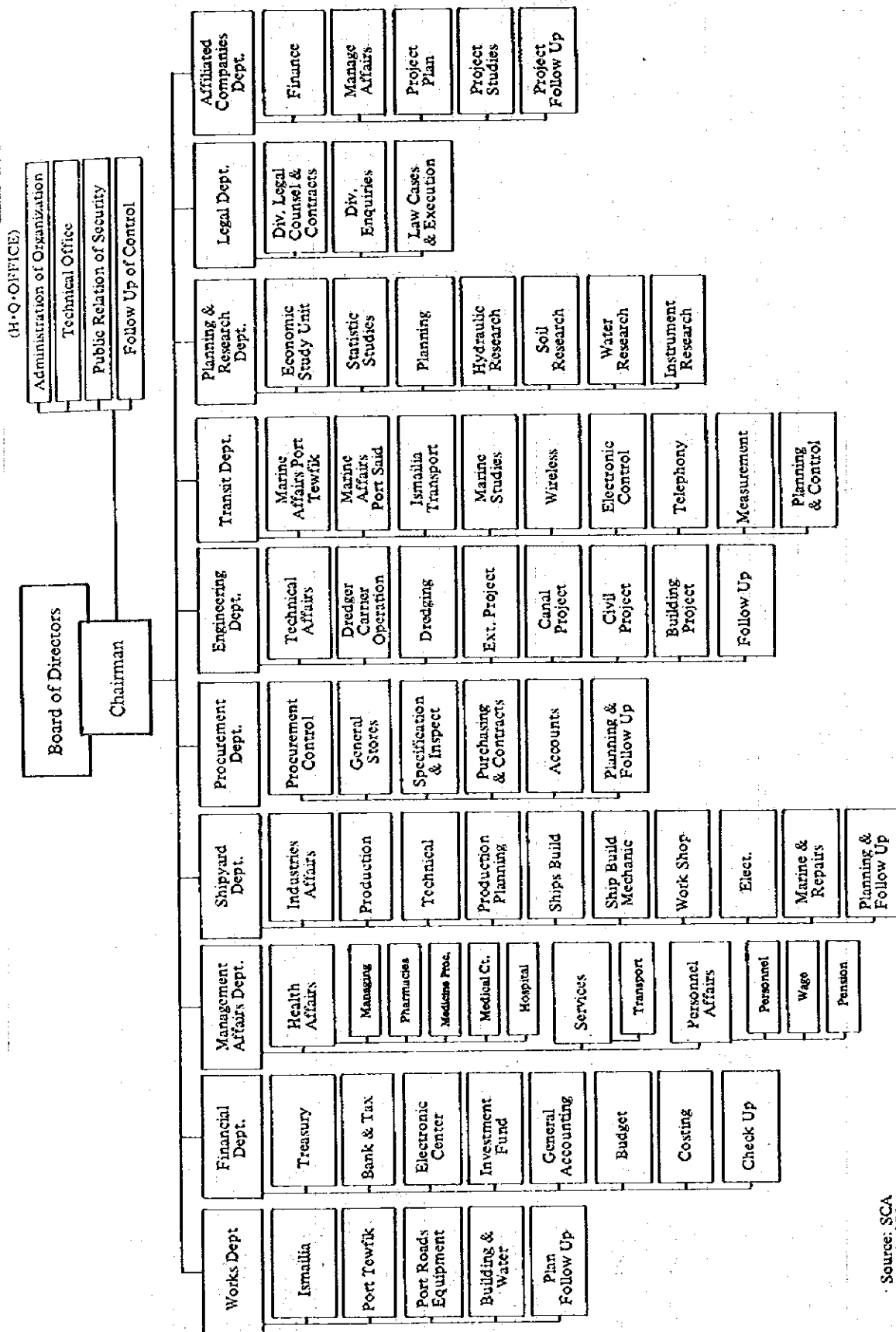


Fig 3-1-1 Organization Chart of Suez Canal Authority

Source: SCA
As of 1979

Table 3-1-1 Number of Employees & Workers

(as of January, 1979)

Profession Dept.	Chairman	Employees								Workers				Total
		Director & Deputy Director	Engineer	Doctor & Pharma- cist	Adminis- trator	Pilot	Port Officer	Tug & Dredging Captain	Specialist	Clerk & Typist	Tech- nician	Sailor & Seamen	Workers & Others	
Chairman H.Q.	1	4	8		38					63	16		539	669
Works Dept.		2	61		14					69	547	218	867	1,778
Financial Dept.		2	-		61					68	26		31	188
Management Affairs Dept.		3	4	56	44					94	597	2	408	1,208
Shipyard Dept.		2	104		9					66	2,423	218	503	3,325
Procurement Dept.		4	11		41					68	92	28	180	424
Engineering Dept.		4	75		6	7		4		36	785	531	527	1,975
Transit Dept.		4	29		14	271	21	45	184	126	498	696	372	2,260
Planning & Research Dept.		2	13		10					8	66	11	26	136
Legal Dept.		-	-		11					3	-		4	18
Affiliated Companies Dept.		3	1		9					8	1		6	28
Total	1	30	306	56	257	278	21	49	184	609	5,051	1,704	3,463	12,009

Source: SCA

2. Facilities owned by SCA

SCA owns 14 dredgers, 19 salvage tugs, 13 harbour tugs and 2 pilot boats for the use of its management and operation of the Canal, with the addition of 2 dredgers now under construction in Japan.

Main specifications of these vessels and craft are shown in Tables 3-2-1, and 10-2-1, 10-2-2, and 10-2-3 in Part X.

Table 3-2-1 Dredgers owned by SCA

No.	Name	Type	Capacity		Note
			H.P.	M ³ /H	
1	Khaled	Suction Cutter	10,000	1,800	Under procurement "
2	Tarek	"	10,000	1,800	
3	M. Younes	"	5,500	800	
4	Khofo	"	5,500	800	
5	26 July	"	2,450	700	
6	10th Ramadan	"	3,300	400	
7	Zenobia	"	1,700	200	
8	1st Sept.	"	1,700	200	
9	Nefertit	"	400	60	
10		"	10,000	2,100	
11		"	10,000	2,100	
12	Salaheldin	Hopper	2 x 1,600	2,200	
13	Ramses	"	2 x 750	60	
14	Mena No. 1	Bucket	Bucket cap. 750 l	300	
15	Mena No. 2	"	Bucket cap. 550 l	200	
16	Khafrah	"	Bucket cap. 850 l	200	

Source: SCA

3. Transit Dues and Other Dues and Charges

SCA collects the following dues and charges from the vessels utilizing the Canal:

1) Transit Dues

Transit dues are levied on the vessels over 300 NRT. transiting the Canal.

a) Loaded Vessels

- (i) Tanker and combined carrier
1.611 SDR/NRT
- (ii) Bulk carrier
 - The first thousand tons 2.420 SDR/NRT
 - The following four thousand tons 2.000 SDR/NRT
 - The rest of the ship's net tonnage 1.611 SDR/NRT
- (iii) Other vessels
 - The first thousand tons 2.660 SDR/NRT
 - The following four thousand tons 2.180 SDR/NRT
 - The rest of the ship's net tonnage 1.772 SDR/NRT
- b) Unloaded vessels
A ratio of 80% of the dues rates on laden vessels is to be levied according to kind and tonnage as quoted in a) above.

2) Berthing Dues

Berthing dues are levied for the use of berth at Port Said, Ismailia and in the SCA's docks at Port Tewfik.

0.400 Piastre/NRT/day: These dues are reduced to 0.150 Piastre from the 10 days after the vessel's arrival.

Berthing dues are not payable by transiting vessels for the first 24 hours nor by small craft not exceeding 300 tons gross Suez measurement during the first five periods of 24 hours.

3) Pilotage Dues

Pilotage dues are not payable by vessels transiting the Canal.

Vessel not transiting the Canal are subjected to the dues for pilotage both on entering and leaving Port Said harbour and SCA's docks at Port Tewfik. Rates of pilotage dues are as quoted in Table 3-3-1.

Vessels which take on board an extra pilot for assisting the pilot in charge shall pay an extra pilotage due of 100 L.E. per Canal pilot, and 50 L.E. per road pilot, except for containers ships and Lash vessels.

Table 3-3-1 Pilotage Dues

NRT		Day Pilotage		Night Pilotage	
Not exceeding	2,500T	LE	10	LE	15
"	5,000T	LE	14	LE	21
"	10,000T	LE	18	LE	27
"	20,000T	LE	22	LE	33
"	30,000T	LE	25	LE	37
Over	30,000T	LE	30	LE	45

4) Charges for changing berth

Vessels shall, when they change berth, pay the charges at the rates as quoted in Table 3-3-2.

Table 3-3-2 Charges for Changing Berth

NRT		Charge	
Not exceeding	2,500T	LE	6
"	5,000T	LE	9
"	10,000T	LE	14
"	20,000T	LE	18
"	30,000T	LE	22
Over	30,000T	LE	25

5) Towage Dues

Vessels towed or convoyed by approved tugs shall pay 8.800 piastre towage dues per ton in addition to Transit dues.

6) Charges for harbour tugs

Vessels shall, when they employ SCA's harbour tug for mooring, getting under way, towing, refloating and changing berth, pay the charges for harbour tugs at the rated in Table 3-3-3.

Provided, however, that the assistance by tugs which is considered necessary by SCA is given free of charge to transiting vessels for mooring and getting under way.

Table 3-3-3 Charges for Harbour Tugs

NRT		Fixed 1 Harbour Tug	Charges 2 Harbour Tugs
Not exceeding	2,500T	LE 8	LE 12
"	5,000T	LE 12	LE 18
"	10,000T	LE 20	LE 30
"	20,000T	LE 30	LE 40
"	30,000T	LE 40	LE 50
Over	30,000T	LE 50	LE 60

4. Financial Status

Operating revenues of SCA are composed of the toll revenues collected from transiting vessels and such miscellaneous revenues as rentals for estate, charges for water supply, charges for ship repairing and rentals for equipment.

Most of the operating revenues are occupied by the toll revenues. In 1978 SCA raised the operating revenues amounting to LE 292.4 million of which toll revenues accounted for about 97%. Toll revenues have increased steadily since the reopening of the Canal in 1975 to reach LE 285 million in 1978. As the transit dues are levied in terms of SDR, the amount of toll revenues calculated for Egyptian pound greatly increased in 1979 when the devaluation of Egyptian pound was effected.

Operating expenses are composed of general administration expenses, public service expenses, expenses for maintenance of equipment, Canal and Port Said expenses, and Canal and Port Said maintenance expenses, which total LE 22.3 million. The Operating Profit for 1978 is therefore LE 255.7 millions which is obtained by deducting from the total operating revenues the amount of operating expenses plus depreciation expenses amounting to LE 14.4 million.

From this figure, further deduction is to be made for the payment of interest, royalty to the Government (5% of Transit Tolls revenues), industrial and commercial tax and other expenses, with the result producing a surplus of LE 107.2 million.

Finally, the surplus is paid into the central government.

Table 3-4-1 and Table 3-4-2 show the financial statements for the 3 years of 1976 – 1978. It will be noted that considerable surplus has appeared through the progressive years. It may be further noted that the depreciation and the payment of interest account for comparatively small, but these figures are expected to increase after the completion of the First Stage Development Project.

The total amount of budget for the First Stage Development Project is as shown below:

	Foreign currency	Local currency	Total	(10 ⁶ LE) Costs up to 1978
Dredging Work	431.4	115.6	547.0	268.7
Civil Work	24.8	84.4	109.2	81.1
Equipment	86.3	7.8	94.1	29.8
Others	9.5	2.2	11.7	0.3
Total	552	210	762	379.9

Note: Computation based on US\$ 1 = LE 0.69.

Source: Suez Canal Development Project – Progress Report(s).

It may be added that the loan for the foreign currency portion of the above budget is as follows:

Loan or Fund	10 ⁶ US\$	10 ⁶ LE (US\$ 1 = LE 0.69)
OECD 1st & 2nd loans	320.25	220.97
Arab loans	139.19	96.04
Bilateral Agreements	52.00	35.88
IBRD	100.00	69.00
U.S. AID	50.00	34.50
SCA Funds	158.56	109.41
Total	820.00	565.80

(Source: Suez Canal Development Project – Progress Report)

From the following financial ratios, it can be said that the present financial status of SCA stands in a sound condition.

	(1976)	(1977)	(1978)
Operating ratio	16.8%	18.6%	12.6%
Return on net fixed assets	19.7%	16.1%	18.0%
Interest earned ratio	2,900%	2,490%	2,580%

Table 3-4-1 SCA Income Statement

(10⁶ LE)

Subjects	1976	1977	1978
Transit Tolls	139.3	167.3	285.3
Miscellaneous	3.5	12.9	7.1
Operating Revenues	142.8	180.2	292.4
General Administration	4.0	4.6	5.7
Public Services	3.0	4.3	4.8
Maintenance of Equipment	4.0	3.7	5.3
Canal & Port Said Exp.	3.0	3.8	4.8
Canal & Port Said Maintenance	0.5	0.8	1.7
Direct Operating Expenses	14.5	17.2	22.3
Depreciation	9.5	16.3	14.4
Operating Profit	118.8	146.7	255.7
Other Income	1.1	1.0	1.8
Other Expenses	4.3	4.7	3.8
Net Profit before Interest & Tax	115.6	143.0	250.1
Interest	4.1	5.9	9.9
Royalty	7.0	8.4	14.3
Industrial & Commercial Tax	41.5	51.1	89.7
Extroardinary Expenses	17.1	20.0	29.0
Surplus	45.9	57.6	107.2

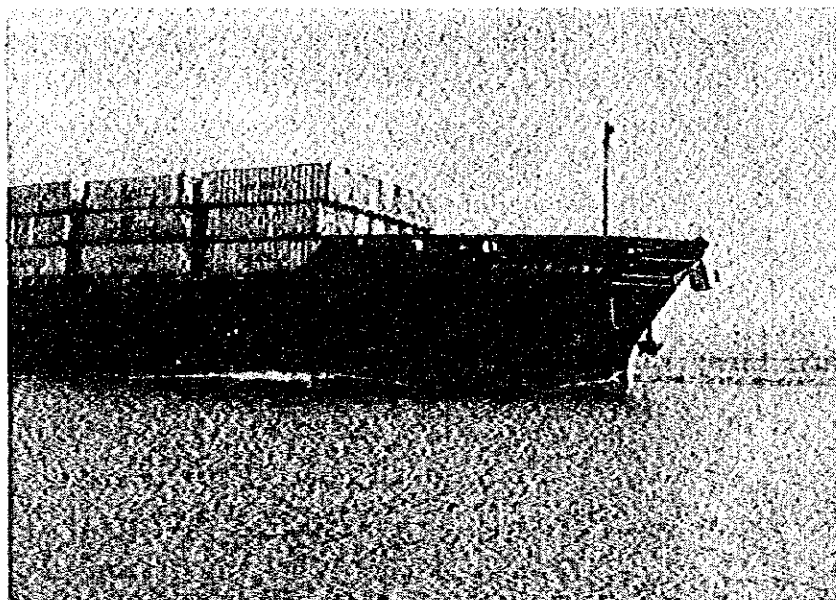
Source: SCA

Table 3-4-2 SCA Balance Sheet

(10⁶ LE)

Subjects	1976	1977	1978
Canal	116.9	290.4	497.8
Building	4.0	11.7	19.0
Other Properties	71.7	102.1	125.1
Total of Fixed Assets	192.6	404.8	643.6
Construction in Progress	13.4	24.0	29.2
Canal Improvement Works	98.1	12.9	22.4
Capital Expenditure	17.4	17.8	15.3
Investments	13.4	14.4	14.4
Stores	13.1	16.1	33.6
Cash A/C	27.5	27.6	75.7
Other	53.0	55.5	28.7
Total of Current Assets	93.6	99.2	138.0
ASSET TOTAL	428.5	572.5	861.2
Capital	145.1	145.1	145.1
Accumulated Depreciation	71.1	83.5	97.4
Financing Project	16.9	35.7	48.2
Industrial & Commercial Tax	45.3	55.5	89.7
Other	3.2	7.0	14.9
Total of Reserve	65.4	98.2	152.8
Foreign Loan	56.0	80.8	247.0
Local Loan	70.5	107.1	164.6
Total of Long Term Loans	126.5	187.9	411.6
Others	20.4	57.8	54.3
LIABILITY TOTAL	428.5	572.5	861.2

Source: SCA



IV. Forecast of Suez Canal Traffic

PART IV FORECAST OF SUEZ CANAL TRAFFIC

1. Introduction

The purpose of this Part is to make a forecast of transit traffic through the Suez Canal with a target year of 2000. However, this forecast mainly deals with the transit traffic in the immediate future until 1985 because of difficulties of making a long-term forecast.

Generally speaking, the recent international economic situation is often affected by political affairs. For example, including trades of oil, grain, iron and steel, machinery, electric appliances and textiles, international trade is so politicized that the field of purely economic goods which is governed solely by the so-called demand-supply relationship has become narrower. Therefore, a long-term forecast of economic prospects until 2000 may be difficult and any such forecast should be regarded as a mere yardstick.

This part consists of 4 chapters excluding the Introduction. They are:

- Chapter 2 World Economy and International Trade
- Chapter 3 International Seaborne Trade and Suez Canal Cargo Traffic
- Chapter 4 Demand & Supply of Ship Tonnages and Market and Maritime Transportation Cost
- Chapter 5 Suez Canal Traffic Forecast

Chapter 1 is an introduction to this part, and describes the way of thinking in forecasting the Suez Canal traffic. However, the methodology used for the traffic forecast is described in Chapter 5.

Chapter 2 reviews some economic circumstances of importing areas east and west of the Suez Canal, through a background analysis of world economy and international trade, and sets up a frame of world economy for this purpose by studying some forecasts of world economy made by international organizations.

Chapter 3's major purpose is to make a forecast-analysis by items of 10 commodities of international seaborne trade and cargoes passing through the Suez Canal including oil, oil products and LNG, and dry cargoes (iron ore, coal, cereals, fertilizer, fabricated metal, cement and other goods). In particular, for each Suez Canal traffic commodity, growth rates roughly by importing area must be established to serve as inputs for the demand forecast of the traffic using models under Chapter 5. The result is briefly stated.

Chapter 4. deals with demand-supply of ship tonnages, market and maritime transportation cost. The main purpose of this chapter is to study the demand-supply situation of tankers and bulk carriers (including combined carriers), trends of market, maritime transportation cost on specified routes, and interrelation among them; to set up a certain target where demand and supply will balance; and to pave a way to the traffic forecast by models under Chapter 5. Computation of ship tonnages by type of ship through the Canal to be derived from the forecast results of the Suez Canal cargoes by item under Chapter 3 shall be made based on the actual carrying shares of ships and load factors (July 1978) by type of ship and by cargo transited through the Suez Canal. Further, with respect to the traffic forecast by type and size of ships, increasing in ratios of containerization and in ship-size are also considered in models under Chapter 5.

(See Chapter 5).

2. World Economy and International Trade

2-1 General

(1) Among economic regions with especially close connection with the Suez Canal, Middle East, Asia (including Japan and China) and Oceania are regarded as importing regions of south-bound cargoes, while North America including USA and Canada, Europe including Mediterranean areas, Centrally Planned Economies of Eastern Europe, and North Africa are also regarded as regions importing northbound cargoes. Hereafter, in principle, the analysis is made in accordance with such a regional classification.

(2) Today's world economy, briefly speaking, can be roughly described as follows; the economic situation of the Developed Economic Countries (US, Canada, Europe, Japan, Australia and New Zealand) and of the East European Centrally Planned Economies are sluggish; The Newly Industrializing Countries (NICs) and the Developing Countries are strenuously chasing the former group, but their situations are severe; and, on the other hand, the oil producing countries are capable of acquiring enormous capital on the strength of their oil resources.

(3) The Developed Economies are partly retrogressing or partly suffering from little progress, due to changes in their economic setups (the collapse of the Bretton-Woods Regime and the fixed exchange rate system) caused by weakened dollar power, the repeated big increase in oil prices, and of the drastic hike in commodity prices. In the mean time, the Non-oil Producing Developing Countries could be said to have been directly hit by such influences. On the other hand, the Centrally Planned Economies of East Europe have such problems as the poor harvest due to inclement weather, the influence of the recession in the market economy sphere, and securing of oil resources. Further, China has revised her 10-year Plan, and is promoting a new modernization plan since 1978. However, the modernization depends much on both technical and economic cooperation from foreign countries.

2-2 Past Trend and Current Situation of World Economy

(1) The world of 1960s was in a period of prosperity, during which the dollar continued to flow out of the US. This flow-out brought prosperity into the world economy. On the contrary, however, US's gold and foreign currency reserves decreased. As a result, the interchangeability between dollar and gold was suspended bringing about the so-called Nixon Shock, which led to the collapse of the Bretton-Woods System which had been one of the fundamental systems of the postwar world economy. Then, the fixed exchange rate system temporarily returned under the Smithsonian system, but it never endured, and in 1973 the major countries again shifted to the floating system.

Further, in autumn 1973 due to the so-called Oil Shock, the world, except the OPEC countries had deficits in international balance of payment, bringing about trade conflicts which threatened GATT's Free Trade System.

The increase in oil price strengthened the purchasing power of the resource-exporting countries, while in the importing countries the deterioration of the terms of trade and the

commodity price hike were common. The latter countries currently are suffering from stagflation.

Meanwhile, the decreased dollar value and the hike of commodity prices hit the oil-producing countries which were obliged to depend upon the import of technology, plants and products of the developed oil-importing industrial countries, and thus, a vicious cycle calling for a further hike of oil prices is repeated.

(2) With respect to the world economy, the annual average growth rate before ten years of the Oil Crisis (1963-73) was 5.5%, but it dropped to 2.3% in 1973-76 or a decrease by more than a half.

In North America which is importing north-bound cargoes, the economic growth decreased from 3.8% to 1.1%, and in Europe from 4.7% to 1.3%. Also, in the Centrally Planned Economies, it decreased from 7.1% to 5.5%.

In Africa (except South Africa) the rate of economic growth decreased from 5.2% to 4.3%.

In the middle East which is connected with south-bound cargoes, it decreased from 8.3% to 5.6% according to the UN Yearbook of National Accounts Statistics 1977. These figures, however, are considered too low. According to the Middle East-North Africa Yearbook 1979-80, such major countries of Middle East as Saudi Arabia, Iraq and Iran demonstrate fairly high values of 12.9%, 10.8% and 7.8% respectively for the period 1970-77.

The economic growth in East and Southeast Asia (except Japan) showed an increase from 4.7% to 5.1%.

In Japan it dropped to a little less than one forth, while in Oceania to around on half.

In this way, in contrast to a remarkable decline in the economic growth rate in the Developed Countries, the rate in East and Southeast Asia increased. Meanwhile, the growth rate in the Centrally Planned Economies and Africa (except South Africa) are declining.

2-3 International Trade

According to Table 4-2-1, the share and the increase rate of international trade by area of the Developed Market Economies, the Developing Market Economies and the Centrally Planned Economies are as follows:

Increases in world imports on cif basis were 13.7% in 1963-73 and 18.2% in 1973-77 respectively. If broken down by area, the increase rate before 1973 was as high as 14.5% in the Developed Market Economies, followed by 12.5% in the Centrally Planned Economies, and 11.6% in the Developing Market Economies. Since 1973 the growth rate of the Developing Market Economies has been as high as 25.3%, while the Developed Economies and the Centrally Planned Economies were 16.6%. And it should be noted that the ranking order had reversed.

A similar tendency is seen in exports. Namely, before 1973, the growth rate of 14.6% of the Developed Market Economies was the highest, followed by 13.4% of the Developing Market Economies and 11.8% of the Centrally Planned Economies. Since 1973, the 26.8% growth rate of the Developing Market Economies was the highest, followed by 17.0% of the Centrally Planned Economies and 15.7% of the developed Market Economies.

With respect to the share of the international trade by area, it can be seen that share increases or decreases correspond to the increase or decrease of the economic growth rate.

The shares of importing areas (Europe, Middle East and Asia), which are closely connected with the passage through the Suez Canal, are as shown in Table 4-2-2.

The share of intra-European trade has a tendency to expand, while the share of Middle East shows such fluctuations as 3.2% in 1970, 8.7% in 1975 and 7.4% in 1978.

The share of Japan and Asia has a tendency towards gradual increase. With respect to the imports of the Middle East, Europe's share was around 44% in 1975-78, while that of the USA was 15-16%. Japan, who competes with Europe, is expanding her share of Middle East's imports. Meanwhile, Europe's share of Asia's imports drastically decreased from 24.5% in 1960 to 16.0% in 1970, then 13.0% in 1975 and 14.1% in 1978.

2-4 Developed Countries Economies

The recent economic growth of seven major developed countries is slightly increased from 4.1% in 1977 to 4.2% in 1978. There are however, some varieties in the growth rates among US, West European countries and Japan.

All of the major countries other than US showed in 1978 an increase from the previous year, while US showed a slight decrease. Japan made a slight increase from 5.4% in 1977 to 5.6% in 1978, while four major European Countries similarly made an increase from 2.5% to 3.3%. Canada also made a similar increase from 2.7% to 3.4%.

GNP Growth Rate (%)					
(against previous year)					
	Weights	1977	1978	1979	1980
USA	35.8	4.8	4.4	2	△ 1½
Japan	16.7	5.4	5.6	6	4%
Germany	10.9	28.3	3.3	3	1%
France	8.0				
U. K.	5.3				
Italy	4.1				
Canada	3.5	2.7	3.4	2½	1½
Above 7 Countries	84.3	4.1	4.2	3½	1
Other OECD Countries	15.7	1.8	2.3	3	2
Total OECD	100.0	3.7	3.9	3½	1

Source: OECD Economic Outlook No. 26

Note: Figures in 1979 are preliminary and in 1980 are forecast.

After the Oil Crisis in the fall of 1973, the world economy reached its bottom in 1975, and the first country who made a recovery was the US. The US economic growth resulted in drastically increased American imports, which played a role of a pace-maker in the world's

economic activities. As a result of increased imports, the deficit in America's current account balance increased.

Table 4-2-3 shows the recent shrinkage of America's current balance deficit from Δ \$14.1 billion to Δ \$13.9 billion in 1978, and further in 1979 with slow-downed economic growth. Japan's surplus in current balance was \$10.9 billion in 1977 and increased to \$16.5 billion in 1978. In 1979, however, Japan's current balance turned to a red of Δ \$7½ billion. European countries showed a trend similar to Japan, but drastically increased from \$3.9 billion in 1977 to \$21.1 billion in 1978. Nevertheless, in 1979 the oil price hike by OPEC countries turned major developed countries to red with a few exceptions. On the other hand, OPEC countries drastically increased their surplus from \$7 billion in 1978 to \$65 billion in 1979. Meanwhile, developing countries' deficits are mounting year by year.

The OPEC Countries may cover the drop in the dollar value and the inflationary effect in future with their oil price hikes. Then basically, this current balance pattern will presumably not change. For this reason the purchasing power in the world will move to OPEC countries, and both developed and developing countries would be unable to avoid slow-downed growth rates. OECD's forecast for 1980 also predicts slow-downed growth. (see columns for '79 and '80 of GDP Table above.)

Now, let's look at the economic trends of Australia and New Zealand, which are importing countries of south-bound cargoes. Australia's GDP growth rate in 1977 was 1¼%, and it went up to 2¼% in 1978. This was due to the fact that though the export growth was sluggish, domestic demand increased. In 1979 the growth rate was accelerated to around 4% because of increased production and export of farm products. New Zealand registered in 1977 and 78 minus growths in her final domestic demand. In 1979 the growth rate turned to plus, but it was not so vigorous.

2-5 Regional Economies and Trades

2-5-1 Middle East (11 Countries)

(1) Here, 11 Middle East countries situated east of the Suez Canal are covered. They are Jordan, Saudi Arabia, Yemen Arab Republic (Yemen AR), People's Democratic Republic of Yemen (Yemen PDR), Oman, The United Arab Emirates (UAE), Qatar, Bahrain, Kuwait, Iraq and Iran.

(2) The general situation of the economy and trade in this area is as shown in Table 4-2-4. The total value of GDP in the 11 countries during 1976-1978 was \$160,060 million in 1976, \$186,600 million in 1977, \$127,990 million in 1978 (excl. Iran). The prominent economic powers among them were Saudi Arabia - \$63,310 million, Iran (1977) - \$76,400 million, Iraq - \$22,720 million, and UAE - \$11,440 million.

(3) Excluding the 3 non oil-producing countries of Jordan (with refineries), Yemen AR, and Yemen PDR (with refineries), the total oil revenue in 1977 of 8 countries was as high as \$90,680 million. In this connection, leaving aside the issue of production cutback, it is fully anticipated that oil prices will be hiked corresponding to the drop in the dollar value and the increase in the commodity price hike.

(4) Agriculture is sluggish except in the two highly self-sufficient countries of Iran (86.1%) and Iraq (73.3%). With respect to industrialization, noticeable are the phosphate, cement, fertilizer and aluminium industries, besides the oil industry, in the 4 countries of Jordan, Saudi Arabia, Yemen AR and Qatar. In this regard, future programs are to be watched.

(5) In connection with the above, the National Plans in those countries are as follows:

Jordan	(\$2,856 million for 1976–80);
Saudi Arabia	(2nd 5-year plan for 1976–80 \$146,779 million (3rd 5-year plan for 1980–85 \$235,000 million):
Yemen AR	(\$3,617 million for 1976–80);
Yemen PDR	(\$217 million for 1975–79);
Kuwait	(\$17,481 million for 1976–78);
Iran	(\$61,925 million for 1973–78)

(6) The total international balance (1977) of this area stands at \$39,539 million import, \$87,609 million (mostly oil) export, and \$25,095 million surplus.

(7) The total population of this area was 69 million in 1977. Among these countries, in Saudi Arabia one-third of the population is reportedly labor and engineers from foreign countries. Other major countries with high percentage of foreign labor are:

UAE (246,000, 89%), Kuwait (212,000, 71%) and Bahrain (30,000, 38%). On the other hand, Iran (182,000, 2%) and Iraq (8,000, 2%).

(Source: Middle East and North Africa 1979–80)

(8) Table 4-2-5 is a comparative table of estimates of total and per capita national income and national disposal income of the major areas of the world (Market Economy countries only). According to this table, the total national income in 1976 of the Middle East Region reached \$221,500 million, or slightly over two times that of Oceania, approximately 1.5 times of Italy, or also slightly less one-half of Japan. Broken down into countries, Iran (\$66,703 million) and Saudi Arabia (\$51,887 million) are outstanding. On per capita basis, the average of the Middle East in 1976 was \$1,770, which is approximately the world average. By country, Kuwait (\$11,431) was the highest in the world, while Qatar (\$8,440) was slightly above the level of North America, and Saudi Arabia (\$5,616) was approximately Netherland's level.

(9) Further, the yearly average (1975–77) flow into the Middle East (11 countries) of bilateral and multi-lateral development assistance is a total of \$285.2 million. Among these countries, Jordan (\$134.9 million), Yemen AR (\$62.6 million), Iraq (\$40.2 million) and Yemen GDP (\$25.7 million) are especially big.

(Source: UN Statistical Yearbook, 1978).

(10) On the other hand, one of the things to be noted is the national defense expenditure. "The Middle East and North Africa, 1979–80" reports that the percentage of defense expenditures against GNP is: Iraq 10.2%, Iran 10.9%, Saudi Arabia 16.4%, and Jordan 15.5%.

(11) The seaborne trade of dry cargo in the Middle East Region (including those countries other than the 11 countries) is as follows:

(Figures are for the unloaded cargoes, Unit: 10³ M/T)

	1966	1973	1974	1975	1976	1977	1978
Middle East	8,807	15,120	20,217	27,712	30,807	45,000	49,000
1976 ~ '78 A.G. Rate		26.1 %					
1974 ~ '78 A.G. Rate		24.8 %					

Source: UN, "Statistical Yearbook 1978"

(12) The Origin/Destination of the (nominal) value of imports of the Middle East (including those other than the 11 countries) is summarized below. A comparison between the shares of imports of Middle East from North America & Europe and Japan is important to the Suez Canal. Although these import values are nominal figures, they show high economic capabilities of the Middle East Area.

Year	Middle East Total Imports	Dry Cargo (Excluding Coal) of which N. America & Europe (Share)	Japan (Share)
	10 ⁶ \$	10 ⁶ \$	10 ⁶ \$
1970	6,520	4,135 (63.4%)	540 (8.2%)
1974	26,170	15,955 (60.9)	3,378 (12.9)
1975	40,280	26,266 (65.2)	5,539 (13.8)
1976	47,300	30,926 (65.4)	6,719 (14.2)
1977	56,570	36,075 (63.8)	8,177 (14.5)

Source: UN, "Statistical Yearbook 1978"

(13) The import trend of 7 items of southbound dry cargoes in 11 countries of Middle East Region is summarized as follows:

	1976		1977		1978	
	Share		Share		Share	
Iron Ore	370,077 (1.3%)		462,939 (1.2%)		424,807 (0.9%)	
Coal	119,027 (0.4)		127,500 (0.3)		150,158 (0.3)	
Cereals	129,414 (0.5)		191,732 (0.5)		168,312 (0.4)	
Fertilizer	1,352,961 (4.8)		1,499,129 (4.0)		2,003,511 (4.4)	
Fab. Metal	4,736,008 (16.7)		6,500,045 (17.4)		8,145,942 (17.9)	
Cement	404,059 (1.4)		442,903 (1.2)		768,272 (1.7)	
Others	16,258,147 (74.9)		23,041,191 (75.9)		28,644,656 (74.4)	
Total	28,436,218 (100)		37,452,530 (100)		45,424,747 (100)	
Share of North Origin	15,992,655 (56.2)		20,687,214 (55.2)		25,990,679 (57.2)	

Source: The Middle East and North Africa 1979 ~ '80.

The above analysis, it also shows that the share of Other Goods in 11 Middle East Countries is high (approx. 75%), while it can be seen that the export share of USA, Europe and eastern Europe to the 11 countries is a little more than 55%.

(14) Further, shares by origin of liner cargoes bound for the Middle East Area are analysed by H.P. Drewry in "Middle East Liner Shipping" as follows:

USA 15%, Europe 40%

(Sub-total of USA & Europe 55%)

Japan & Other Far East 30%

Others 15%

These figures roughly coincide with the other analysis mentioned above.

2-5-2 Asian NICs and Developing Countries

(1) The ASEAN (Thailand, Malaysia, Indonesia, Singapore and The Philippines) economy in 1978, except the Philippines economy turned upward in 1977 and its growth rate attained a level as high as 7-8%. It is noteworthy that the ASEAN region, side by side with the Newly Industrializing Asian countries of ROK and Hong Kong, is maintaining high economic growth. Factors common to all ASEAN countries in 1978 were that agricultural output increased thanks to good weather, that the domestic demand was active, and that hitherto inactive private investment showed recovery. Commodity price hike was contained within 10% in every country, but the monetary policy was maintained basically tight to cope with inflation. As to foreign trade, except in the case of Malaysia and Singapore, export was mostly sluggish due to poor demand in developed countries. Due to rapid growth in imports, the trade balance worsened in every country. In particular, foreign trade deficits expanded in Thailand and the Philippines.

In 1979, due to the increases in the oil price and public service charges, commodity prices went up again.

(2) ROK's economy attained two-digit growth in 1978 for the third consecutive year. According to an announcement made by the Bank of Korea, Korea's GNP in 1978 registered an increase of 33.6% over the previous year in nominal terms, or 12.5% in real terms. Her exports expanded to more than \$12,500 million or \$200 million above the 1978 goal, and the import to \$15,000 million.

(3) Hong Kong attained also two digit growth in 1978 for the third consecutive year. Though her economy is reportedly the export-oriented type, the 1978 growth was dominated by domestic demand. The economic growth led by domestic demand brought about a worsening of the trade balance weakening of the exchange rate of Hong Kong dollar, accelerated inflation, and soaring interest rates. China's trade policy which recently had become very elastic had much impact on the economic Policy of Hong Kong. Especially, Hong Kong's economic tie with Canton Province is becoming closer.

(4) Bangladesh registered 8% GDP real growth rate in FY 1977/78 (July to June), the highest rate since her independence in 1971. The major reason was the increased (7.7%) agricultural

production centering around foodstuffs. Also contributing to the growth were 12% and 7% increases in the manufacturing and service industries respectively.

With respect to foreign trade, export in FY 77/78 increased 4.5% over the previous year, while imports drastically increased by 29%. The reason for the drastic increase was the remarkable increase of imports of foodstuff due to the slump in agricultural production in FY 76/77, and due to the 53% increase of imports of such raw materials as raw cotton, fertilizer and cement and capital goods such as machinery and transportation equipment both needed for the recovery of industrial production. Of late, her trade balance is further worsening.

(5) Sri Lanka registered a 8.2% GNP real growth rate in 1978 over 4.4% for the previous year. Her economic growth in 1977 was solely supported by increased agricultural production, while, in 1978, in addition to the prosperous farming, it was characteristic that activities in almost all the fields such as manufacturing, construction, and servicing were vitalized.

(6) India's real economic growth rate in FY 77/78 (April ~ March) was 7.2%, or the highest in the 1970s. The biggest reason for this prosperity was the 13.9% increase in agricultural production which account for about 44% of her GNP. In particular, her cereals production, which is the biggest contributing factor, registered a historically high 125.6 million tons. This enables the exporting of surpluses to the USSR and Vietnam.

As to foreign trade in FY 78/79, her imports increased by 9.6% over the previous year, while exports increased only 2.6%. As a result, the deficit in her trade balance, which had turned red in the previous year, increased to Rupee 10,620 million.

The drastic increase in imports reflected the losing of import regulations on intermediate goods, raw materials, machine parts and other goods for investment. This policy is being continued in FY 79/80.

(7) In Pakistan, the real GNP growth rate in FY 1977/78 (July ~ June) drastically increased from the previous year's 1.4% to 6.5%. Agricultural production increased by 4.3% during the same period (2.1% in the previous year.) The growth in agricultural production was largely due to the recovery of production of raw cotton which is Pakistan's biggest export item. Cotton output in FY 77/78 reached 3,230,000 bales, regaining the 3 million level for the first time in three years.

2-5-3 East European Countries

(1) According to the UN Statistical Yearbook 1978, net material product (NMP) of Centrally Planned Economies is as follows:

						A. G. Rate (%)			
1975=100	1960	1970	1973	1976	1977	60-77	70-77	73-77	76-77
a) NMP	39	74	90	105	110	6.3	5.8	5.1	4.8
Note: Excluding the services of general government and of private organization.									
b) Agriculture									

						A. G. Rate (%)			
1975=100	1960	1970	1973	1976	1977	60-77	70-77	73-77	76-77
	88	101	104	101	104	1.0	0.4	0.0	3.0

c) Industrial Activity

1975=100	1960	1970	1973	1976	1977	A. G. Rate (%)			
						60-77	70-77	73-77	76-77
	30	68	85	106	112	8.1	7.4	7.1	5.7

(2) Table 4-2-6 shows economic development plans (–1980) and actually attained rates (–1978) by industry of East European Countries. According to this table, only Byelorussian SSR achieved the planned rate. The Soviet Union attained an actual output rate just equal to the planned 4%, while all other countries failed to achieve the planned rates. This was attributable to low agricultural output due to bad weather in the northern part of East Europe caused by cold waves. In the industrial sector fairly satisfactory rates were obtained although the rate differed according to country. However, as seen under (3) in the above, the growth rate is declining year by year, and especially in the case of USSR. The growth has been remarkably sluggish since the 10th 5-year plan (1976–80) started.

(3) As for foreign trade, exports of East Europe in 1977 were \$108,400 million (world total – \$1,124,500 million, share – 9.6%), while the imports in the same year were \$115,200 million (world total – \$1,154,600 million, share – 10.0%), and the balance was excess imports of \$6,800 million.

(Source: UN Statistical Yearbook 1978)

(4) As to the Centrally Planned Economies as a whole, the NMP growth rate Particularly in the latter part of 1970s declined. In the near future, it will be sluggish.

(Source: Yearbook of National Accounts Statistics 1977).

2-5-4 Africa (Excluding South Africa)

According to the UN Statistical Yearbook 1978, the situation of gross domestic product by sector is as follows:

a) GDP

1960	1970	1976	1977	A. G. Rate (%)		
				60-70	70-77	76-77
40	79	106	112	5.0	5.1	5.6

b) Agriculture

1960	1970	1976	1977	A. G. Rate (%)		
				60-70	70-77	76-77
79	94	103	103	1.5	1.3	0.0

c) Industry

1960	1970	1976	1977	A. G. Rate (%)		
				60-70	70-77	76-77
27	98	112	120	9.2	2.9	7.1

d) Construction

1960	1970	1976	1977	A. G. Rate (%)		
				60-70	70-77	76-77
40	57	113	125	6.9	11.9	10.6

(1) Though the African economy is not suitable for agriculture due to rigorous weather, the growth rates in the industrial and construction fields are steadily increasing in general. However, it depends on assistance funds from foreign countries. For instance, the annual average amount of aid from developed countries (both bilateral and multilateral) during 1975-1977 was \$5,000 million, and bilateral commitments of capital by Centrally Planned Economies to this areas was \$3,735 million in 1977.

(2) Amounts of foreign trade in 1977 of 6 North African countries (Algeria, Egypt, Libya, Morocco, Sudan and Tunisia) which have especially close connection with Suez Canal are: Export (fob) \$47,110 million, import (cif) \$47,530 million, and deficit \$420 million. And, in general, the trade balance of Africa is not in a good condition.

2-6 Future Prospects of World Economy

Prior to making a projection of Canal transit until 2000, a study is made of future world economy scenarios recently made public by international organizations.

They are OECD's "Interfutures" announced in June 1979, and World Bank's "World Development Report" announced in August 1979.

2-6-1 Scenario of Each Prospect

(1) OECD Interfutures

a) Scenario A:

Expanded conflicts, group control and enlargement of free trade among developed countries. Strengthened participation of the Third World in international trade.

It assumes that the economic development in developed countries will be maintained, but no drastic change in the Judgement of value will be foreseeable.

Productivity of OECD countries will be become relatively uniform.

b) Scenario B₁, B₂, B₃:

These assume that relations among developed countries, among developing countries, and between the two groups will not change in substance.

Economy of developed countries will grow gently.

Under B₁ value judgement will suddenly change.

Under B₂, relative productivity will be averaged.

Under B₃, there will emerge differences in growth due to social and schematic differences among developed countries.

c) Scenario C:

This scenario is set up to analyse the possibility and contents of confrontation between the South

and the North.

Implementation of separative strategy by majority of developing countries.

North Countries perform group control while expanding free trade.

Each country further slows down her economic growth without making any change in the judgement of value.

Major OECD countries will be affected by various influences owing to a rupture of North-South relation, and averaging of productivity will not be hoped.

d) Scenario D:

Split among developed countries.

Three controlling spheres will be established centering around US, EC, and Japan respectively, and protectionism will pop out.

These three spheres will embrace regional groups of developing countries.

Foreign Trade instability will cause slow-down of economic growth.

(2) World Bank

1979 Report is a revised one of 1978 Report which can not be justified in view of the recent situations.

Such parts are as follows:

Among factors affecting developing countries, there will be yellow lights on economic development, namely in the sphere of world trade, assistance in generous terms, and commercial bank's loan for years 1975-1985. For this reason, growth prospects for 1975-1985 must be adjusted from 5.7% to 5.2%, (for middle income countries from 5.9% to 5.3%). Also, low income African countries' decline will be large.

Exports of non-fuel primary products from the developing countries during 1976-1990 will grow at an annual rate of 3.3%.

With respect to the prospects of manufactured goods export, no further protective measures will be introduced, because economic development in developed countries will recover the annual rate level of 4.2% in the 1980s and also those countries have made up their minds to improve their economic policies and to evade introduction of protectionism.

The prospects of world trade growth must be made on the assumption that the trade among developing countries would continue its rapid growth.

As to foreign capital supply, particularly the ODA of developed industrial countries affiliated with DAC, the percentage of aid to GNP is expected to become 0.35% in 1985.

Alternative Scenario (High Growth Scenario & Low Growth Scenario)

High Growth Scenario:

Economic growth rate of developed industrial countries 1980-90 will recover the 4.9% level in the 1980s. In such a case, world trade would achieve a big growth of annual 7.3%. The export growth rate of developing countries would be more than this figure.

ODA will expand, and in 1990 it would reach 0.45% of GNP in the case of the developed industrialized countries.

Energy prices in 1980s will be hiked at an annual rate of 2% in real terms.

Low Growth Scenario:

Economic growth of developed countries will not be able to exceed the slow pace of the past 10

years. As the result, world trade growth will stay at an annual rate of about 5% decline. Growth of manufactured goods exports from developing countries will decline considerably to an annual rate of about 9%. This compares with 13% in the case of the High Growth Scenario and will 11% in the case of the Basic Scenario.

In the Low Growth Scenario, energy price increase is not taken into account.

The growth rate of 4.8% in developing countries under the Low Growth Scenario resembles the experience during 1974–78, while 6.6% under the High Growth Scenario could be considered as roughly equal to that during 1965–74.

2-6-2 Analysis of Economic Prospects

Firstly, according to DECD Interfuturs the view on the long-term economic development rate, "natural resources needed for the growth will never be physically short, but the growth rate will be obliged to be lowered for socio-economic reasons". As for the social constraints on the economic growth, especially in Euro-American developed countries, the following are mentioned:

- 1) Changes in the sense of value;
- 2) Stiffened social set up being pressurized by pressure groups, trade unions, etc.;
- 3) Lowered power of Governmental coordination.

As for the economic constraints the following are mentioned:

- 1) Short chance of investment and lowered productivity;
- 2) Constraint by international financial balance;
- 3) Inflation.

Next, World Bank's Development Report is primarily aimed at assessing the development prospects of the developing countries, and for that reason, the growth rates of world economy and of developed countries are not detailed studied.

Concrete rates of world economic growth are annually 5% under OECD Interfuture's Scenario A, 4.4% under Scenario B(2), 3.5% under Scenario C, and 4.3% under Scenario D. The figures of Scenario D and B(2) are close. Case D assumes that the grouping of area economies will proceed, trade protectionism will come up, and trade will be some unstable.

This, however, is a less probable Scenario. The World Bank's Report established as a model case in the 1980s, the economic growth rates 4.2% in developed industrial countries, 6.0% in Japan, 5.6% in developing countries, and world trade growth rate of 6.0%. Further, the High Growth Case and the Low Growth Case of world economy are shown with $\pm 0.7\%$ margins.

As a future framework of the world economy, it is considered that Case B(2) of OECD's Interfutures would be most likely. The 4.4% growth rate under B(2) is very close to that under the Standard Scenario of World Bank's Development Report. By the way, actual economic growth in the past were 5.3% during 1960–73 and 3.8% during 1973–78. A high-pace growth such as that during the 1960s through the early 1970s could never be expected in future considering the low growth rate since the Oil Crisis.

2-7 Concluding Remarks

- (1) As a result of the analysis of the world economy and international trade, it can be said that,

in terms of an importing region of southbound cargo, the Middle East region has the best economic and trade potential. Other importers of southbound cargoes include Japan and Australia which are making comparatively steady progress among the developed nations, the fast-rising NICs such as South Korea, Singapore and Hong Kong and the ASEAN group of Indonesia, Malaysia, the Philippines and Thailand whose growth is remarkable among the developing countries. There are also India, Pakistan and Sri Lanka and China which is marching with resounding steps towards modernization. Compared with northbound cargoes, southbound cargoes generally have a bigger growth rate because many of the countries served have great potential for development. However, many of the southbound cargoes importing countries, with the exception of those in the Middle East region, are non-oil producing countries. They are, moreover, engaged in the processing trade which depends on other countries for many resources. It should be kept fully in mind, therefore, that they have an economic constitution which is exceptionally susceptible to inflation and oil price increases which affect their balance of payments. The future economic and trade trends of these countries, moreover, will be greatly affected by the trend of their exports to the fully matured economic societies of Europe and the United States.

(2) The importing region of northbound cargoes includes North Africa which has a potential for economic and trade development. However, the major proportion of northbound cargoes is imported by European countries (including those in the Mediterranean area) and the United States whose economies are already fully matured and some of them conceivably may even experience minus growth in view of the possible future cost pressure of crude oil. The economic and trade prospects of Eastern Europe under centrally planned economies are not so good, with adverse weather affecting agricultural production and the slowdown of the economic growth rate in the latter half of the 1970s. Consequently, it is believed that not much expectation can be placed on the future of northbound cargoes.

(3) When the above economic and trade circumstances of the countries involved are taken into account, it would seem that for the purpose of this study Scenario B₁ of the OECD Interfutures is the most appropriate assumption among the existing projections of the world economy. Consequently, in the following chapters, particularly in projecting the growth rate of the Suez Canal traffic by cargo in Chapter 3, Scenario B₂ is assumed as the framework of the world economy.

Table 4-2-1 Share of World Trade by Region, Country or Area

(%)

	Imports (c.i.f.)			Exports (f.o.b.)		
	1963	1973	1977	1963	1973	1977
World	100	100	100	100	100	100
Developed Market Economies	68.1	72.7	68.9	67.3	70.8	64.9
Developing Market Economies	20.2	16.7	21.1	20.4	19.2	25.4
OPEC	2.9	3.5	7.2	6.1	7.3	13.3
Centrally Planned Economies	11.7	10.5	10.0	12.2	10.0	9.3
North America	15.4	16.6	17.3	19.3	16.8	14.4
Europe	44.9	41.6	43.2	41.1	44.8	41.2
Centrally Planned Economies	10.8	9.5	9.2	11.1	9.2	8.9
Africa (excl. South Africa)	4.1	3.0	4.1	4.0	3.7	4.2
Japan	4.1	6.5	6.1	3.5	6.4	7.2
Middle East Asia	2.2	2.4	5.1	3.4	4.7	9.4
Other Asia	6.9	5.9	6.3	5.5	5.5	6.4
Oceania	2.2	1.6	1.4	2.4	2.0	1.4

Source: UN. Statistical Yearbook 1978.

Table 4-2-2 Inter-Regional Trading Pattern

(%)

To From	Europe				Middle East				Asia			
	'60	'70	'75	'78	'60	'70	'75	'78	'60	'70	'75	'78
Europe	54.7	43.5	63.2	66.0	51.1	41.9	44.3	44.9	24.5	16.0	13.0	14.1
U.S.A.	11.5	10.2	7.9	7.0	16.5	15.9	16.4	15.4	—	—	—	—
M. E.	5.1	3.2	8.7	7.4	12.4	12.2	9.2	7.9	5.5	5.3	19.5	17.9
Japan	0.9	1.9	2.1	2.5	3.7	7.1	12.4	14.0	8.3	14.8	12.9	15.0
Asia	3.9	1.8	2.1	2.6	6.5	4.6	5.7	6.7	23.3	15.6	16.3	19.5

Source: UN. "Monthly Bulletin of Statistics"

Table 4-2-3 Current Balances of OECD Countries

10⁹ \$; seasonally adjusted, at annual rates

	1977	1978	1979	1980
United States	-14.1	-13.9	- 2½	3½
Japan	10.9	16.5	- 7½	- 8½
Germany	4.2	8.8	- 1	- 5
France	- 3.3	3.9	1½	- 1½
United Kingdom	0.5	2.0	- 5½	½
Italy	2.5	6.4	6½	5½
Four Major European Countries	3.9	21.1	- 1½	- ½
Canada	- 4.0	- 4.6	- 6	- 7½
Seven major countries	- 3.3	19.0	-14½	-13
Other OECD countries	-21.7	- 9.8	-15½	-18½
Total OECD	-24.8	9.1	-30	-31½
OPEC	29	7	65	75½
Other developing countries	-24	-36	-47	-60

Source: OECD, Economic Outlook No. 26

Note: Figures in 1979 are provisional and in 1980 are forecast.

Table 4-2-4 Basic Data of Regional Economy (Middle East)

Nation	Y	GDP		78 10 ⁴ Population (Est.) G. Rate (%)	Average Inflation (%) '75~'78	Agriculture Self Supply (1976)	Oil				Industry (10 ⁴) (Main Products) '78	National Plan (10 ⁴ \$)	'77 Import (10 ⁴ \$)	'77 Export (10 ⁴ \$)	'77 Balance of Payments (10 ⁴ \$)
		10 ⁴ \$	'73~'76 (%)												
(1) Jordan	'76	1,820													
	'77	1,960	n.a.	2,985 (3.3)	11.0	80 (21.9)	-	-	1.5	-	Phosphate 2,320 Cement 553	2,856	1,381 (15.9)	249 (20.8)	30
(2) Saudi Arabia	'76	2,270													
	'77	40,860													
	'77	55,210	7.9	7,870 (3.0)	13.0	227 (18.7)	22,701	390.0	24.4	380	N. Fertilizer (76) 87 Cement (76) 1,104	14,651	43,465	12,791	
(3) Yemen A.R.	'78	63,310													
	'76	1,620													
	'77	2,540	n.a.	5,098 (1.9)	21.0 (~'77)	325 (48.4)	-	-	-	-	Cement (76) 6,300 Aluminum P. (76) 0.2	1,040	11	303	
(4) Yemen GDP	'78	2,960													
	'76	470													
	'77	600	4.6 (69~'70)	1,749 (1.9)	2.9 (~'77)	14 (9.8)	-	-	7.2	-			335	177	Δ 92
(5) Oman	'78	740													
	'76	2,090	n.a.	839 (3.2)	n.a.	n.a.	342	16.0	-	13.4 (76)			n.a.	n.a.	n.a.
	'77	2,050													
(6) UAE	'78	2,160													
	'76	10,050													
	'77	11,100	(Middle East average Rate 5.6)	804 (16.7)	n.a.	n.a.	4,290	91.7	0.8	80			n.a.	n.a.	n.a.
	'78	11,440													
(7) Qatar	'76	2,440													
	'77	2,440	n.a.	223 (10.3)	n.a.	n.a.	548	24.0	5.3	19	N. Fertilizer (76) 87		n.a.	n.a.	n.a.
(8) Bahrain	'78	2,840													
	'76	1,220													
	'77	1,390	n.a.	368 (7.1)	12.7	n.a.	178	2.8	13.0	4.4			n.a.	n.a.	n.a.
(9) Kuwait	'78	1,510													
	'76	14,390													
	'77	14,420	n.a.	1,212 (6.2)	7.6	n.a.	9,070	95.0	37.0	85		17,481	4,484 (20.3)	9,798 (Δ10.9)	5,483
(10) Iraq	'78	13,040													
	'76	15,950													
	'77	18,490	11.0	12,216 (3.4)	5.7 (~'77)	2,054 (73.3)	4,398	125.0	8.7	95			3,898 (24.3)	9,664 (Δ0.5)	1,209
	'78	22,720	(~'75)												
(11) Iran	'76	69,170													
	'77	76,400	6.9	35,849 (3.0)	16.5	8,987 (86.1)	8,083	262.5	46.0	230		73~'78 61,925	13,750 (25.9)	24,245 (Δ0.2)	5,371
	'78	n.a.													
Sub-Total	'76	160,060											39,539	87,609	25,095
	'77	186,600													
	'78	127,990	(N.A.: Iran)												

Table 4-2-5 Estimates of Total and Per Capita National Income and National Disposal Income

Region, Country	Total						Per Capita					
	1960	1963	1970	1975	1976	1977	1960	1963	1970	1975	1976	1977
	10 ⁶ \$						\$					
Total (Market Economy)	1,019,700	1,264,200	2,233,600	4,448,400	4,849,100	-	520	600	930	1,670	1,780	-
North America	486,300	572,900	949,600	1,487,800	1,670,800	1,841,000	2,450	2,750	4,200	6,300	7,020	7,670
cf. U.S.A.	425,143	535,805	877,860	1,344,079	1,499,341	1,666,489	2,502	2,831	4,285	6,294	6,969	7,686
Europe	298,000	389,900	693,900	1,535,000	1,592,700	-	970	1,230	2,080	4,460	4,610	-
cf. Bahrain	10,303	12,576	23,345	57,691	62,905	73,224	1,126	1,354	2,417	5,887	6,406	7,449
Italy	31,954	45,629	85,078	156,342	152,942	-	637	891	1,585	2,800	2,723	-
Netherlands	10,104	13,071	29,110	74,947	81,751	96,801	880	1,092	2,234	5,491	5,937	6,989
U.K.	66,294	79,036	112,777	204,769	198,179	217,684	1,261	1,476	2,035	3,664	3,546	3,898
Greece	3,393	4,545	9,585	19,943	21,575	106,213	410	540	1,090	2,204	2,353	2,701
Middle East	17,000	21,500	42,100	183,300	221,500	-	210	250	400	1,500	1,770	-
cf. Bahrain	-	-	195	763	-	-	-	-	888	2,935	-	-
Iran	3,794	4,502	10,586	52,835	66,703	-	176	192	369	1,600	1,986	-
Iraq	1,359	1,568	2,831	12,846	-	-	198	208	300	1,159	-	-
Kuwait	-	1,325	2,082	11,431	-	-	-	3,397	2,814	11,431	-	-
Oman	-	-	182	1,647	-	-	-	-	277	2,139	-	-
Qatar	-	-	113	1,688	-	-	-	-	801	8,440	-	-
Saudi Arabia	1,137	1,312	3,563	39,188	51,887	-	190	204	460	4,371	5,616	-
East Southeast (Ex. Japan)	103,400	137,300	292,400	651,900	727,800	-	120	150	260	530	580	-
cf. Hong Kong	1,034	1,344	2,958	7,035	-	-	338	393	747	1,599	-	-
Korea, Rep. of	3,579	3,666	8,055	18,295	24,797	31,549	143	134	250	519	691	866
Singapore	685	893	1,800	5,156	-	-	419	496	870	2,292	-	-
Japan	39,222	60,443	176,231	430,063	483,946	-	417	624	1,689	3,855	4,291	-
Oceania	18,800	22,900	40,800	102,400	109,100	-	1,200	1,370	2,110	4,810	5,060	-
cf. Australia	14,770	18,066	33,468	86,447	93,391	-	1,438	1,650	2,675	6,278	6,709	-
New Zealand	3,428	4,171	5,704	12,361	11,911	-	1,445	1,647	2,030	4,026	3,855	-

Source: UN. Statistical Yearbook, 1978.

Table 4-2-6 Changes in Growth of the Net Material Product in East European Countries

Country and period	Net material product (billions of national currency units) at current prices	Net material product		Gross output			
		Plan	Actual	Agriculture		Industry	
				Plan	Actual	Plan	Actual
Bulgaria	15.1	9.0	6.5	5.0	4.1	9.2	6.7
1976	15.5 ^a	8.2	6.3	4.0	-4.6	9.2	6.9
1977	16.2	6.8	6.0	5.0	5.0	7.7	7.0
1978	17.3	7.0	-	7.0	-	7.8	-
1979	18.8	7.2	-	4.8	-	8.6	-
1980	-	7.7	-	4.1	-	9.2	-
1976-1980							
Czechoslovakia	393.2 ^a	5.0	4.2	5.3	-2.4	5.4	5.5
1976	409.6	5.2	4.2	8.2	9.0	5.3	5.7
1977	425.9	4.9	4.0	3.4	1.5	5.1	5.0
1978	444.2	4.3	-	3.8	-	4.5	-
1979		4.9	-	3.6	-	5.7-6.0	-
1976-1980							
German Democratic Rep.	147.7 ^a	5.3	3.7	1.4 ^b	-4.9	6.0	5.9
1976	155.3	5.5	5.2	2.8	6.8	5.1	5.4
1977	161.5	5.2	4.0	3.5	3.0	5.7	5.4
1978	168.5	4.3	-	1.3	-	5.5	-
1979		5.0	-	4.0	-	6.0	-
1976-1980							
Hungary	432.4	5.0-5.5	3.0	ca 4.0	-2.7	6.0	4.6
1976	473.5	6.0-6.5	7.8	7.0-8.0	10.3	6.0	6.6
1977	510.0	5.0	4.0	2.0-3.0	2.0	5.5-6.0	5.2
1978	527.8	3.0-4.0	-	3.0-3.5	-	4.0	-
1979		5.4-5.7	-	3.4	-	6.0	-
1976-1980							

Country and period	Net material product (billions of national currency units) at current prices	Gross output					
		Net material product		Agriculture		Industry	
		Plan	Actual	Plan	Actual	Plan	Actual
Ukrainian SSR							
1976	69.8	4.5	6.0	7.9	10.8	4.1	4.1
1977	73.5	4.8	5.0	4.3	5.2	5.3	5.7
1978	75.7	4.3	3.0	4.0	0.1	4.7	4.4
1979	78.8	4.2		4.5		5.2	
1976-1980		4.9		4.1		5.9	
Eastern Europe ^d							
1976		7.0	5.7			7.4	7.4
1977		6.6	5.8			6.7	7.0
1978		6.1	4.3			6.7	6.0
1979		4.6				6.0	
1976-1980		6.6				7.5	
Soviet Union and Eastern Europe ^d							
1976		5.9	5.9			5.2	5.5
1977		4.8	4.8			5.9	6.0
1978		4.6	4.1			5.1	5.1
1979		4.4				5.7	
1976-1980		5.3				6.6	
							4.8
							2.0
							0.1
							3.2
							3.2
							5.4

Source: UN. European Economy in 1978, Chapter 3 "Recent Economic Developments in Eastern Europe and The Soviet Union" National Statistics, plans and plan-fulfilment reports".

Note: Changes for five-year periods are annual averages. For agriculture, five-year targets are annual percentage changes over 1975, recalculated by the ECE Secretariat. In all countries, except Romania, the original targets were five-year annual averages in relation to the previous five-year average.

a At constant prices.

b Distributed NMP.

c Based on supplementary plan. The original five-year targets were as follows: NMP - 10.0-11.0 per cent, gross output in agriculture - 6.5-8.6 per cent; gross output in industry - 10.2-11.2 per cent.

d Albania excluded. For the method of weighting.

Table 4-2-7 Future Prospects of World Economy (up to 2000)

1) OECD: Interfutures

Scenario Region	GDP (1970 US\$ billion)					A. Growth Rate (%)			
	1975	2000				A	B2	C	D
		A	B2	C	D(3)				
1. United States	1,091.0	2,418	1,992	2,139	2,325	2.4			2.7
2. Canada	103.3	262	211			2.9			
3. Japan	257.5	1,365	1,095	477	1,005	6.9	6.0	2.5	5.6
4. EC	705.3	2,070	1,588	1,157	1,477	3.3			3.0
5. Western Europe other than EC	150.8	674	562	293	460	6.0			4.6
6. Australia and New Zealand	48.8	123	108	88	121	3.2			3.7
OECD	2,356.7	6,885	5,556	4,154	5,388	3.5			3.4
7. Eastern Europe	607.8	2,058	1,962	1,700	1,962	4.8			4.8
8. Latin America	235.5	1,279	1,137	964	1,085	6.5			6.3
9. South Asia	82.6	280	250	215	220	4.5			4.0
10. Southeast Asia	84.5	459	391	330	371	6.3			6.1
11. China	212.8	913	913	812	913	6.0			6.0
12. North Africa and Western Asia	150.3	816	645	560	645	6.0			6.0
13. Sub-Saharan Africa	49.7	208	145	121	198	4.4			5.7
Total 8-13	815.9	3,955	3,481	3,002	3,432	6.0			5.9
WORLD Total	3,802.3	12,970	11,057	8,984	10,836	5.0	4.4	3.5	4.3

Notes: A: High growth scenario
B2: Moderate growth Scenario
C: North-South rift Scenario
D: Protectionist Scenario

2) World Bank

Growth and Levels of Gross Domestic Product Under Alternative Scenarios

	Average Annual Growth Rates, 1980-90 (percent, at 1975 prices)						Gross Domestic Product Per Capita (1975 US dollars)			
	Gross Domestic Product			Gross Domestic Product Per Capita			1975	1990		
	Base	High	Low	Base	High	Low		Base	High	Low
Low Income Countries	4.9	5.9	4.3	2.7	3.5	2.0	147	211	232	200
Africa	3.8	4.8	3.6	1.0	1.9	0.7	146	165	181	160
Asia	5.0	6.0	4.4	2.8	3.8	2.2	148	219	240	206
Middle Income Countries	5.8	6.8	4.9	3.4	4.3	2.4	950	1,476	1,622	1,354
East Asia and Pacific	7.6	9.3	6.4	5.6	7.1	4.3	582	1,399	1,638	1,258
Latin America and Caribbean	5.7	6.5	4.6	3.2	3.9	2.1	1,103	1,632	1,756	1,471
Middle East and North Africa	5.5	6.3	5.0	2.9	3.6	2.4	823	1,234	1,325	1,173
Sub-Saharan Africa	4.4	5.3	3.7	1.4	2.2	0.7	544	630	683	586
Southern Europe	5.4	6.5	4.7	4.2	5.2	3.4	1,808	3,122	3,463	2,907
All Developing Countries	5.6	6.6	4.8	3.3	4.2	2.4	499	773	849	712
Industrialized Countries	4.2	4.9	3.5	3.7	4.5	3.1	5,865	9,999	10,747	9,381
Capital Surplus Oil Exporters	5.0	6.1	4.6	2.2	3.2	1.7	6,192	8,439	9,332	8,049
Centrally Planned Economies*	4.2	-	-	3.4	-	-	2,560	4,351	-	-

* East European centrally planned economies only.

3. International Seaborne Trade and Suez Canal Cargo Traffic

3-1 General

In this chapter, an outline of world seaborne trade under various economic conditions is given at the start. This is to show that the transit cargoes through the Suez Canal will be influenced by the conditions of shipping market. In order to make a forecast of the future trade related to the Suez Canal, origin/destination tables related to the Suez Canal are prepared for each major item in the related import zones analyzed in the preceding chapter and the growth of each item is studied.

3-2 Past Trend of International Seaborne Trade

The following items are dealt with in this chapter.

Crude Oil & Oil products

Liquefied natural gas

Iron ore

Coal

Cereals

Fertilizer

Fabricated Metals

Cement

Other goods

Furthermore, additional traffic of large-sized ships which will be able to transit the canal after the completion of 1st Stage Development Project is taken into account by estimating potential volume of traffic and share of Suez-route.

In estimating the trend of future seaborne trade, the past trend and under what economic and trade structures it has developed must be analyzed. And this consideration is very useful in writing a scenario for future transit cargoes through the Canal.

In this chapter, an outline of the shipping market for tankers and tramp ships and the world economy since 1961 is given and material is provided to estimate the volume of future seaborne trade.

3-2-1 World Economy and Seaborne Trade from 1961 to 1965

In 1961, although west European economies, especially those of France and Italy began to pick up, other economies remained depressed and such international monetary problems as the dollar crisis and revaluation of the mark came to the fore.

In 1962, the US and Japanese economies started to recover, supported by the growth of export, and west European countries continued to show recovery.

In 1963, the USA and West Europe experienced a complete recovery of their economies and managed to maintain forward momentum, while the economic growth of Japan and the U.K. was restrained due to their unfavorable balance of payment.

In 1964 and 1965, the expanding economy was sustained with the U.S. and West German

economies maintaining a steady advance.

In the meantime, the growth of seaborne trade of dry cargoes remained at a low level up to 1963 and an excess of ships' tonnage actualized due to large ore and coal carriers entering into service.

The building of bulk carriers continued thereafter but the brisk economic activities in 1964 and 1965 maintained the demand for bottoms at a comparatively high level and the imported grain demand of the communist block at that time greatly alleviated the pressure of over tonnages. However, the existence of grain tankers restricted an upturn of freight rate.

While, in the tanker sector, the liquidification of energy in the west European nations completed the first stage, the demand for tankers was not so big that the unbalanced ships tonnage which existed from the 1950's did not disappear in 1962. In 1963, with the visit of a cold wave in the beginning of the year, the seasonal demand for tankers increased more than in usual years and the upturn of the world economy raised the tanker freight level and the balance of supply and demand for tonnage was regained somewhat. However, the pressure of supply of bottoms, mostly of large tankers, remained strong and the increase of cargo traffic per ton/mile basis was relatively small due to the increased production of crude oil in Libya which is very near to consuming countries. For these reasons a relatively depressed market remained in 1965.

3-2-2 International Economy and Seaborne Trade from 1966 to 1970

The economy of industrial nations which continued steady progress until 1965 and turned toward cost inflation in 1966 and a trend of restrained growth developed. This effect appeared as a synchronized recession in the latter half of the year and the earlier part of the following year. Among these nations, Japan and Italy recorded high economic growth.

In 1968, the U.S.A. and West Germany recovered from mid-summer. Their economic growth was so great world trade began to expand.

In 1969, investment in plant and equipment became active and west European nations except U.K. marked a rapid tempo of expansion and world trade also grew further. However, Japan's growth was restrained and the U.S. economy also showed decline.

The expanding trend of the O.E.C.D. countries which continued for these two years slowed down in 1970 and the world economy remained generally stagnant, though a sign of recovery was observed in the U.S.

In the meantime, seaborne trade of dry cargo showed little growth in 1966 and 1967 and there were few factors affecting seaborne trade except grain aid to India, Pakistan and the Middle East in 1966. The brisk construction of large bulk carriers continued. Under these circumstances, stagnation of the dry cargo tramp ship market was inevitable. However, in 1967, the Middle East War caused the closure of the Suez Canal, which saved the shipping market from depression, though international trade slackened.

In 1968, ships' tonnage entering service showed a growth of 6.8% growth over the preceding year (10 million gross tons), while seaborne trade increased 8.9% and, in 1969, tonnage grew 6.6% while seaborne trade grew 7.2%, creating a favorable supply and demand balance, and a stronger market. Further, in 1970, demand for ships became stronger mostly for raw materials for Japanese steel makers, accelerating the strong market trend since 1969.

However the tanker market had little impetus, with the volume of idle tankers over 300 thousand tons and the existence of the large volume of grain tankers showed a tanker market remaining strongly depressed. The temporary suspension of oil transport through IPC pipe line failed to produce market recovery. Although seaborne trade remained active, as supply of bottoms showed similar growth, the market continued to be depressed until 1968. In 1969, successive completions of giant tankers brought about a large growth in tonnages but as the TAP line broke at the end of May and it took a long time for reopening, the demand for bottoms rapidly increased, raising the freight market. In 1970, the volume of seaborne trade on ton/mile base and the growth of ships' tonnage were roughly identical (15.6% and 14.7% respectively) but the freight rate further increased with higher demand for bottoms due to the 2 years' of continued economic boom and psychological factors arising from political instability.

3-2-3 International Economy and Seaborne Trade from 1971 to 1975

In 1971, the USA alone marked rapid expansion, while Japan and Europe retrogressed, experiencing imbalanced economic growth together with inflation. In the following year, however, the Smithsonian conference improved international monetary stability, and as each nation undertook economy-boosting measures, Western Europe and Japan followed suit to the U.S. in economic recovery. As the economic recovery was synchronized, it was very strong. The trend continued through 1973, except for Italy, bringing about a shortage of supply of basic commodities with little elasticity of supply and sharp increase in the price of primary products, and inflation accelerated with the background of excessive liquidity. Further in October 1973, a war broke out in the Middle East, and the commodity price further increased because of the oil embargo of OPEC and quadruple price rise of oil.

As a result, every nation suffered a trilemma of recession, inflation and unfavorable balance of payment. In 1974, the economy slowed down all over the world and every nation recorded minus growth. This was the start of the greatest and longest post-war recession, which reached the bottom in 1975. As desire for capital investment by each nation was largely reduced, the GNP growth rate of the OECD nations remained -1.0%.

In 1971 seaborne trade rapidly declined and the growth rate of trade dropped to 0.7% compared with the preceding boom year, with the reduced production of steel in Japan and Europe and the good grain crop in the developing nations in the same year, because the boom of 1970 occurred during the period when the world economy was subsiding and trade expansion was gradually weakening. In 1972 also, though the increase of cargoes remained only at 4%, as the growth of tonnage was 6% in 1971 and 7% in 1972, bottoms continued to be in excessive supply.

However, the Shipping market started to show signs of recovery in the latter half of 1972 due to Soviet grain purchases and trade of raw materials for steel making became active. The market was improved greatly from the fall. In 1973, the increase of seaborne trade marked 10.5% with the background of simultaneous recovery of world economy.

During this period, as the growth of ships' tonnage remained at 5.1%, the tonnages became in short supply and the market continued to advance, bringing about the world's highest postwar boom. The Middle East war brought about an unfavorable effect on the tanker-market but helped the tramp market. The trend continued through 1974, but the cargo traffic started to decline in

1975. The growth rate of the trade volume turned to minus for the first time in the 17 years since 1958. Almost all types of cargo decreased in volume, upsetting completely the demand and supply balance of ships.

After the depressed condition in 1971 and in the first half of 1972, the tanker market began to recover due to the stopping of nearly 1.4 million tons of tankers by the strike of the Japan Seamens Union, and the alternative demand for Japanese charters who had to cover of immediate tonnage requirement.

In 1973, the abolition of quota system for imported oil in the U.S., nationalization of oil wells by the oil producing nations, participation in management and the price hike, etc., successively took place, bringing about a change of shipping arrangement due to the change of import sources and the buying rush, which culminated in the greatest postwar shipping boom by creating a strong demand for bottoms. The subsequent oil shock, however, brought a sharp drop of the market and in 1975, the ships ordered during the boom period, mostly VLCCs, increased by 15.5%, further aggravating the market condition.

3-2-4 International Economy and Seaborne Trade From 1976 to 1978

The trend of economic recovery from 1975 continued through the 1st quarter of 1976, but no nation could adopt a positive expansion policy as they had to restrain inflation. For this reason, industrial countries could not adopt a reflation policy and the huge deflation gap accrued. In this situation, the economic growth again dropped.

In 1977, the world economy generally stayed stagnant except for the U.S.A., where recovery of equipment investment was observed. However, towards the last quarter, the economy recovered somewhat through financial measures taken by Japan and other European nations for fear of further depression. After the low growth of these two years, the economy slowly recovered in 1978, moving toward gradual growth.

During these years, the growth of seaborne trade of dry cargoes was small and adjustments of ships' tonnage were made by intensifying slow-steaming and part-cargo.

In 1977, a 6.4% growth in tonnage over the preceding year was recorded, reflecting a generally stagnant market rather than eliminating the absolute imbalance of bottoms. In 1978, however, a sign of recovery in the supply and demand balance started to appear along with the general economic recovery of OECD nations.

In the tanker sector, the imbalance of supply and demand after the oil shock was aggravated through 1977, and the freight market stayed at a low level, although 56 – 59 million tons of tankers were absorbed by slow-steaming and 15 million tons by cargo partly loaded and a further 7.53 million tons were scrapped in the same year.

In 1978, the same as in the preceding year, the market showed a weak trend, with a substantial volume of slow-steaming, part-cargo and laid-up tonnage. The growth of tankers compared with the preceding year showed -3%, while sea-borne trade of oil on the ton-mile base also remained at -2.8%.

The development of five major dry bulk commodities, other goods and oil cargo are shown in table 4-3-1, and correlation of GDP of OECD countries and world seaborne cargo volume are shown in the figure 4-3-1.

Table 4-3-1 (a) World Major Bulk Cargo Seaborne Trade (1960-64)

		(Ton base)			(10 ⁶ M/T)	
Year		1960	1961	1962	1963	1964
Item						
Five major dry bulk cargoes total		228	239 (4.8)	246 (2.9)	269 (9.3)	308 (14.5)
Iron ore		101	98 (Δ3.0)	102 (4.1)	107 (4.9)	134 (25.2)
Coal		46	48 (4.3)	53 (10.4)	64 (20.8)	60 (Δ6.3)
Grain		46	57 (23.9)	53 (Δ7.0)	59 (11.3)	71 (20.3)
Bauxite and Almina		17	17 (0.0)	18 (5.9)	17 (Δ5.6)	19 (11.8)
Phosphate Rock		18	19 (5.6)	20 (5.3)	22 (10.0)	24 (9.1)
Others		312	331 (6.1)	354 (7.0)	371 (4.8)	412 (11.1)
Dry Bulk Total		540	570	600	640	720
Oil		449	478	547	590	661

		(Ton-mill base)			(10 ⁹ M/T)	
Year		1960	1961	1962	1963	1964
Item						
Five major dry bulk cargoes total		746	833 (11.7)	854 (2.5)	956 (11.9)	1,146 (19.9)
Iron ore		264	298 (12.9)	314 (5.4)	348 (10.8)	456 (31.0)
Coal		145	157 (8.3)	170 (8.3)	202 (18.8)	199 (1.5)
Grain		248	283 (14.1)	272 (Δ3.9)	304 (11.8)	378 (24.3)
Bauxite and Almina		34	35 (2.9)	37 (5.7)	35 (Δ5.4)	39 (11.4)
Phosphate Rock		55	60 (9.1)	61 (1.7)	67 (9.8)	74 (10.4)
Others		—	—	1,202	1,298 (8.0)	1,437 (10.7)
Dry Bulk Total		—	—	2,056	2,254	2,583
Oil		1,900	2,100	2,350	2,600	2,850

Source: Fearnley & Egers "World Bulk Trades"
B.P. Statistical Tables

Table 4-3-1 (b) World Major Bulk Cargo Seaborne Trade (1965-69)

		(Ton base)			(10 ⁶ M/T)	
Year		1965	1966	1967	1968	1969
Item						
Five major dry bulk cargoes total		327 (6.2)	340 (4.0)	352 (3.5)	384 (9.1)	419 (9.1)
Iron ore		152 (13.4)	153 (0.7)	164 (7.2)	188 (14.6)	214 (13.8)
Coal		59 (Δ1.7)	61 (3.4)	67 (9.8)	73 (9.0)	83 (13.7)
Grain		70 (Δ1.4)	76 (8.6)	68 (Δ10.5)	65 (Δ4.4)	60 (Δ7.7)
Bauxite and Almina		21 (10.5)	23 (9.5)	25 (8.7)	26 (4.0)	30 (15.4)
Phosphate Rock		25 (4.2)	27 (8.0)	28 (3.7)	32 (14.3)	32 (0.0)
Others		485 (8.0)	515 (6.2)	535 (3.9)	582 (8.8)	617 (11.0)
Dry Bulk Total		812	855	887	966	1,036
Oil		730	821	867	992	1,093

		(Ton-Mile base)			(10 ⁹ M/T)	
Year		1965	1966	1967	1968	1969
Item						
Five major dry bulk cargoes total		1,260 (10.0)	1,360 (7.9)	1,465 (7.7)	1,614 (10.2)	1,813 (12.3)
Iron ore		527 (15.6)	575 (9.1)	651 (13.2)	775 (19.0)	919 (18.6)
Coal		216 (8.5)	226 (4.6)	269 (19.0)	310 (15.2)	385 (24.2)
Grain		386 (2.1)	408 (5.7)	380 (Δ6.9)	340 (Δ10.5)	307 (Δ9.7)
Bauxite and Almina		46 (17.9)	55 (19.6)	62 (12.7)	70 (12.9)	84 (20.0)
Phosphate Rock		85 (14.9)	96 (12.9)	103 (7.3)	119 (15.5)	118 (Δ0.8)
Others		1,469 (2.2)	1,549 (5.4)	1,635 (5.6)	1,811 (10.8)	1,948 (7.6)
Dry Bulk Total		2,729	2,909	3,100	3,425	3,761
Oil		3,100	3,400	4,511	5,206	6,020

Source: Fearnley & Egers "World Bulk Trades"
B.P. Statistical Tables

Table 4-3-1 (c) World Major Bulk Cargo Seaborne Trade (1974-78)

		(Ton base)			(10 ⁶ M/T)
Item	Year	1970	1971	1972	1973
Five major dry bulk cargoes total		488 (16.5)	490 (0.4)	505 (3.1)	599 (18.6)
Iron ore		247 (15.4)	250 (1.2)	247 (Δ1.2)	298 (20.6)
Coal		101 (21.7)	94 (Δ6.9)	96 (2.1)	104 (8.3)
Grain		73 (21.7)	76 (4.1)	89 (17.1)	116 (30.3)
Bauxite and Almina		34 (13.3)	35 (2.9)	35 (0.0)	38 (8.6)
Phosphate Rock		33 (3.1)	35 (6.1)	38 (8.6)	43 (13.2)
Others		677 (9.7)	683 (0.9)	716 (4.8)	750 (4.7)
Dry Bulk Total		1,165	1,173	1,221	1,349
Oil		1,228	1,314	1,444	1,627

		(Ton-Mile base)			(10 ⁹ M/T)
Item	Year	1970	1971	1972	1973
Five major dry bulk cargoes total		2,182 (20.4)	2,254 (3.3)	2,296 (2.2)	2,779 (20.6)
Iron ore		1,093 (18.9)	1,185 (8.4)	1,156 (Δ2.4)	1,398 (20.9)
Coal		481 (24.9)	434 (Δ9.8)	442 (1.8)	467 (5.7)
Grain		393 (28.0)	406 (3.3)	454 (11.8)	622 (37.8)
Bauxite and Almina		99 (17.9)	108 (9.1)	109 (0.9)	133 (22.0)
Phosphate Rock		116 (Δ1.7)	121 (4.3)	135 (11.6)	159 (17.8)
Others		1,985 (1.9)	2,021 (1.8)	2,148 (6.3)	2,408 (12.1)
Dry Bulk Total		4,167	4,275	4,452	5,187
Oil		6,684	7,911	8,834	10,235

Source: Fearnley & Egers "World Bulk Trades"
B.P. Statistical Tables

Table 4-3-1 (d) World Major Bulk Cargo Seaborne Trade (1970-73)

		(Ton base)			(10 ⁶ M/T)	
Item	Year	1974	1975	1976	1977	1978
Five major dry bulk cargoes total		668 (7.4)	635 (Δ4.9)	646 (1.7)	645 (Δ0.1)	667 (3.4)
Iron ore		329 (10.4)	292 (Δ11.2)	294 (0.7)	276 (Δ6.1)	278 (0.7)
Coal		119 (14.4)	127 (7.6)	127 (Δ0.0)	132 (3.9)	127 (Δ3.8)
Grain		130 (Δ6.5)	137 (5.4)	146 (6.6)	147 (0.7)	169 (15.0)
Bauxite and Alumina		42 (10.5)	41 (Δ2.4)	42 (2.4)	46 (9.5)	46 (0.0)
Phosphate Rock		48 (11.6)	38 (Δ20.8)	37 (Δ2.6)	44 (18.9)	47 (6.8)
Others		955 (11.2)	916 (Δ4.1)	996 (8.7)	1,024 (2.8)	1,054 (2.9)
Total		1,623	1,551	1,642	1,669	1,721
Oil		1,603	1,467	1,675	1,695	1,653

		(Ton-Mile base)			(10 ⁹ M/T)	
Item	Year	1974	1975	1976	1977	1978
Five major dry bulk cargoes total		3,157 (8.2)	3,121 (Δ1.1)	3,122 (0.0)	3,124 (0.1)	3,219 (3.0)
Iron ore		1,578 (12.9)	1,471 (Δ6.8)	1,469 (Δ0.1)	1,386 (Δ5.6)	1,384 (Δ0.1)
Coal		558 (19.5)	621 (11.3)	591 (Δ4.8)	610 (3.2)	560 (Δ8.2)
Grain		695 (Δ8.5)	734 (5.6)	779 (6.1)	801 (2.8)	945 (18.0)
Bauxite and Alumina		158 (18.8)	168 (6.3)	158 (Δ6.9)	167 (5.7)	162 (Δ3.0)
Phosphate Rock		168 (5.7)	127 (Δ24.4)	125 (Δ1.6)	160 (28.0)	168 (5.0)
Others		2,609 (14.9)	2,515 (9.0)	2,752 (9.4)	2,896 (5.2)	2,901 (0.2)
Total		5,766	5,636	5,874	6,020	6,120
Oil		10,867	10,016	10,229	10,464	9,693

Source: Fearnley & Egers "World Bulk Trades"
B.P. Statistical Tables

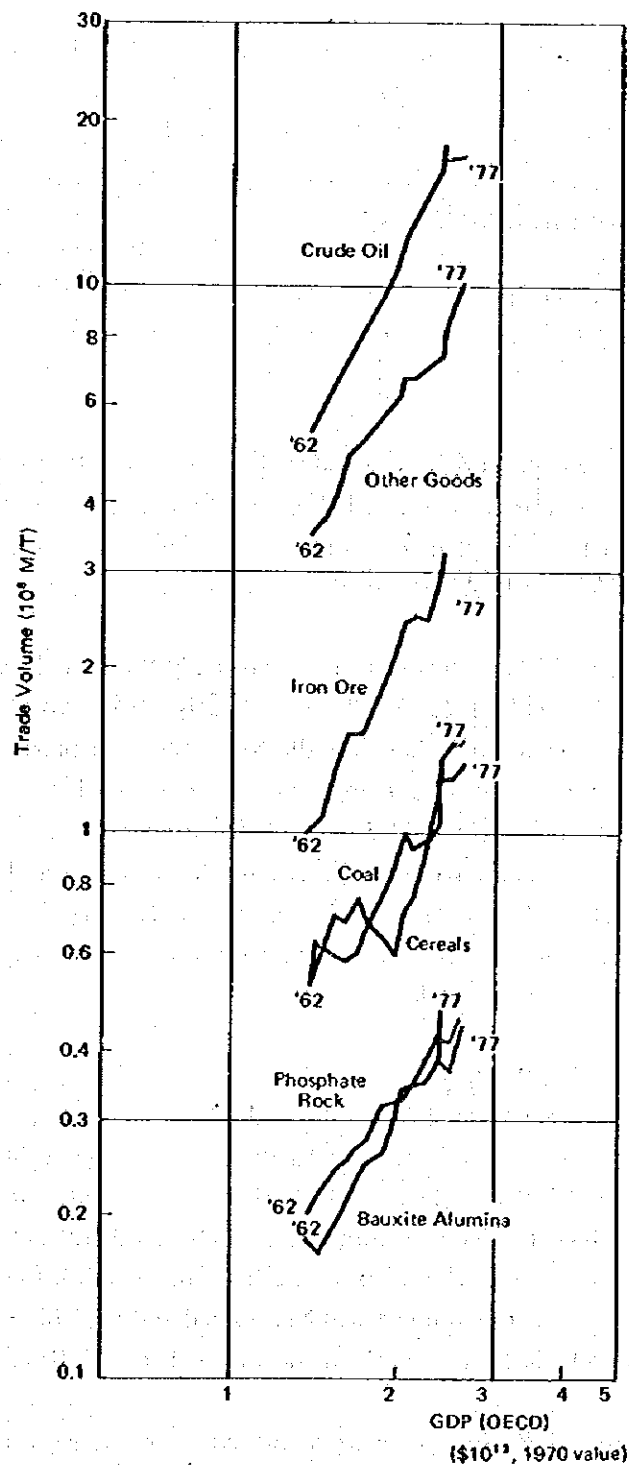


Fig. 4-3-1 Correlation of GDP and seaborne cargo volume

3-3 Oil

3-3-1 Crude Oil and Oil Products

(1) Premises of Forecast

The flow of seaborne trade of oil (crude oil and oil products) which may transit the Suez Canal is classified into the following three routes.

- 1) Middle East/North Western Europe
- 2) Middle East/Mediterranean Europe
- 3) Middle East/North America

The foregoing trade flows cover exports from the Middle East and the future trade volume will be largely affected by the production of crude oil by oil producing nations in the Middle East.

Fig. 4-3-1 shows a flat level of crude production of about 20 million barrel/day since 1974 by 6 oil producing nations in the Middle East, viz. Saudi Arabia, Iran, Iraq, Kuwait, the United Arab Emirates and Qatar.

Oil price has about doubled in 1979 and this price hike is roughly the same level as the quadruple price rise during the first oil crisis in 1973. This will largely affect world economy and oil consuming countries will have restraint policy. At the same time, oil producing countries will control their production and will not give ready consent to increasing output. Under these circumstances crude oil production by the Middle East countries will project a level of slight increase in the next five years. Judging from the recent situation in Iran and Afghanistan, etc., the present confusion in the Middle East should continue at least through the mid 1980's. Therefore, this study has employed rather conservative values, in forecasting oil flow as a basis for calculating the revenue of the Suez Canal.

The following premises are used in this forecast.

- 1) The target years of forecast are 1980, 1985, 1990 and 2000.
- 2) Total volume of imports of major oil importing nations in the import quota adopted at the Tokyo Summit of June, 1979 (see Table 4-3-2). However, considering the change in the international situation since the Tokyo Summit, imports of oil by each area from Middle East are estimated at 5% less than those estimated from the Summit figures. For 1990 and 1995, the import quota set at the Summit will be attained and the crude production by the Middle east countries will reach their peak in the first half of 1990s and fall to the 1985 level by 2000.
- 3) of the oil exports from Middle East to Europe and North America, the percentage of oil exported by tankers from Arabian Gulf is estimated to decrease somewhat in the 1980's in view of the working condition of pipe lines.
- 4) of the total oil imports of Western Europe and North America, the percentage of Middle East oil is estimated to be the same as in 1977.
- 5) The trade volume in 1980 is estimated at 5% less than actual trade volume in 1977 in consideration of decrease of demand due to the oil price increase and the Middle East situation. For the U.S.A., a 10% decrease is used considering the trouble in Iran.

Table 4-3-3 shows results based on the foregoing premises.

Major reason for the decrease of seaborne trade of oil from the Arabian Gulf to Europe since 1980 is the effect of the pipelines. The foregoing volume of trade is largely dependent on the future trend of the Middle East situation. Therefore, forecasts are made on the safe side to estimate the revenue of the Suez Canal.

The volume of oil trade in the above covers transit of the Suez Canal from south to north. There is also southbound oil trade.

The southbound oil transit of the Suez Canal mostly includes oil products of which about 4 million tons have been transported yearly by small tankers since 1976.

Exporting countries are about 50% Soviet and Eastern Europe and the balance Mediterranean countries.

Importing countries are about 40% India and Vietnam and about 30% for Middle East countries. India's imports may increase, but imports by Middle East countries may decrease due to construction of refineries in those countries. As there are many political uncertainties in other nations, this study employs the record of transit in 1978 (4.82 million tons).

Table 4-3-2 Restrictive Goal of Oil Import in Major Industrial Countries

		(10 ⁶ M/T)
Australia	13.5	(17.0)
Austria	11.5	(13.5)
Belgium	30.0	(31.0)
Canada	7.4	(29.4)
Denmark	16.5	(11.0)
W. Germany	143.0	(141.0)
Greece	14.8	(16.5)
Ireland	6.5	(8.0)
Italy	103.5	(124.0)
Japan	265.3	(308.66)
Luxembourg	1.5	(2.0)
Netherlands	42.0	(49.0)
New Zealand	4.2	(4.4)
Norway	▲15.5	(▲18.3)
Spain	51.0	(52.9)
Sweden	29.9	(29.0)
Switzerland	14.0	(14.5)
Turkey	17.0	(25.0)
U.K.	12.0	(▲5.0)
U.S.A.	437.2	(436.0)
Total	1,205.3	(1,289.56)

Source: Nihon Keizai Shinbun Dec. 11, 1979.

Note: Figures in Bracket are 1985

Table 4-3-3 Expected Volume of Transit Oil through the Suez Canal

(10⁶ M/T)

O/D \ Year	1980	1985	1990	1995	2000
From Arabian Gulf to N.W. Europe	242	234	233	233	221
From Arabian Gulf to Medit. Europe	154	141	138	138	132
From Arabian Gulf to North America	131	134	141	141	134
Total	527	509	512	512	487

Table 4-3-4 Expected Volume of Transit LNG through the Suez Canal

(10⁶ M/T)

O/D	'84	'85	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95	'96	'97	'98	'99	2000
From Arabian Gulf to N.W. Europe	0	0	0	1.9	3.7	6.1	8.4	8.4	9.3	10.2	10.2	11.1	12.0	12.0	12.9	13.8	13.8
From Arabian Gulf to North America	1.5	2.9	4.4	5.8	5.8	9.5	13.1	13.1	14.9	16.7	16.7	18.5	20.3	20.3	22.1	23.9	23.9

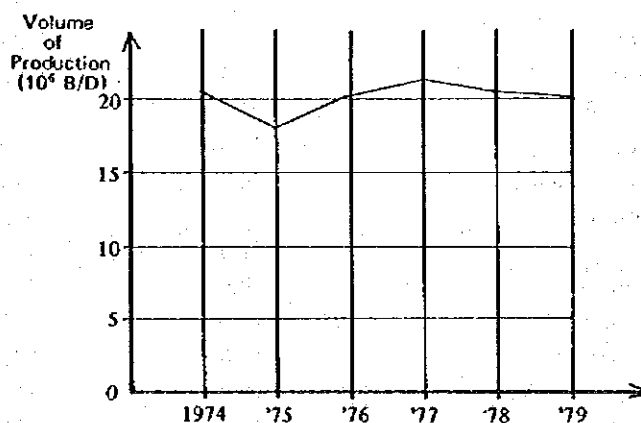


Fig. 4-3-2 Crude Oil Production in Middle East

3-3-2 LNG

With regard to the LNG (liquefied natural gas) transit of the Suez Canal, as the trade flow is determined according to the development plan of LNG (Long term contract), the current development projects in the world have been studied and the annual trade volume is estimated from the result of the study. As there are no projects operating or under-way related to the Suez Canal, and they are either at the planning stage or under-study, the following premises are used in the estimate of each project.

- 1) Project under planning are assumed to be 100% completed and the starting year is delayed by 4 years for Iran-related projects and 1 year for other parts of the Middle East.
- 2) 50% achievement is estimated for the projects under study in view of uncertainty of realization and a 7 year delay for Iran projects and 3 year delay for other Middle East projects.
- 3) For 1990 and thereafter, the following new projects are forecast.
North America : Studying a scale of 1000 M.cf/d for every 3years.
North Western Europe : Studying a scale of 500 M.cf/d for every 3 years.

Table 4-3-4 shows the results of forecast based on the foregoing premises.

3-4 Dry Cargoes

3-4-1 Outlook of Transit Dry Cargoes of the Suez Canal

The transit cargo volume of the Suez Canal from 1960 to 1977 increased an average of 3.7% annually and the world seaborne trade volume of dry cargo in the same period increased by an average of 6.8%.

The relative low growth of the transit volume of the Suez Canal compared with the world growth is attributable to the following causes.

- 1) Japan's share in the world seaborne trade increased to an unproportionately high extent.
- 2) The change of economic structure of the areas of export and import related to the Suez Canal and diversification of trade counterpart of imported area, has caused the declining of reliance on import from European nations by the Middle East and Indian Ocean area.
- 3) The increase of intra-regional trade in Europe.
- 4) Some part of dry bulk commodities have shifted to load over large-sized ships which do not depend on the Suez Canal.

However, the future transit number of ships through the canal will be increased, because the high share of general cargo may increase and this category of goods is indispensable for the development of Middle East and South African nations. Furthermore the canal capacity will permit more larger vessels and even increasing bunker cost will be more advantageous for the canal.

Now, we are going to deal with individual commodity items.

3-4-2 Iron Ore

The change of the seaborne trade volume by area is given in Iron Ore Seaborne Trade Matrix of Fearnley & Egers.

The total volume of the world seaborne trade is given in Table 4-3-5.

Of which, the volume of iron ore transit through the canal is

	(10 ³ M/T)		
	1976	1977	1978
Northbound	7,275	4,038	3,904
Southbound	1,000	1,000	1,000
Total	8,275	5,038	4,904

These figures are taken from Suez Canal Annual Report, in which iron ore is included in the same section as bauxite, manganese, copper, tin, zinc, etc. under Ore & Metals.

The northbound figure is given by percentage of iron ore separately but the southbound includes besides iron ore the above-mentioned items.

	(10 ³ M/T)		
	1976	1977	1978
Suez Canal Report (Southbound)	1,326	1,341	1,581
F & E (Other Europe/Japan)	1,082	968	1,084

From the data of Fearnley and Egers, the route related to the southbound canal transit is selected, which is Other Europe/Japan, which involves a trade volume of 1 million tons.

The volume matches the amount of long-term import contracts made by Japanese trading firms with the Soviet Union for Japanese steel mills. Therefore, the iron ore transit through the canal southbound is estimated at 1 million tons per year and this figure is used for the forecast of southbound traffic.

Meanwhile, the following two routes are selected as related to the northbound transit of the Suez Canal for iron ore from the F & E figure.

The transit volumes are as follows:

	(10 ³ M/T)		
	1976	1977	1978
From Asia to U.K. Cont., Medit, Other Europe	2,190	1,707	1,175
From Australia to U.K. Cont., Medit, Other Europe	12,192	15,630	14,688

Among them the total quantity of India/Europe trade is considered to transit the canal. However, as for Australia/Europe trade, as comparatively large sized bulk carriers are in service, dependence on the canal is relatively small, i.e. 14.9% in 1977, 18.6% in 1978.

But, after the completion of the first stage of the canal improvement work, the total volume of transit will increase. The transit cargoes are by northbound and southbound and major loading and unloading ports are given in the attached table. (see Table 4-3-6).

Next, future trends are discussed.

For the northbound, major import areas are Western Europe, with some imports into the Soviet Union and Eastern Europe from Asia and Australia.

However, the production of pig iron and crude steel in Western Europe has remained at the same level in recent years (see Fabricated Metals Section) and no substantial increase is expected in the near future, while the growth in Soviet and Eastern Europe showed an average increase of 3.7% annually from 1970 to 1978.

Other north African nations have recently started to develop steel making industries, and construction of a 20 million ton mill in Algeria and 5 to 6 million ton mills in Libya and Egypt is under-way.

The supply of raw materials to these mills will come from South America and West Africa, beside Asia and Australia as aforesaid, and if the former two areas are selected, the Suez Canal will not be involved. Especially, as iron ore prices are comparatively low (e.g. FOB \$15.28 for Tubarao/Europe, 1979), there is a tendency to seek sources in nearby areas. Therefore, northbound transit volume of iron ore is estimated not to grow too much.

The southbound trade volume is determined by the growth of steel making industries in Japan and other Southeast Asian countries and the areas of raw material procurement.

From 1970 to 1978, the annual average growth of crude steel production in Southeast Asian Countries was 3.3%. The major supply source of southbound iron ore may be the Krivoy Rog mine of USSR.

As a comparatively high growth of steel production in Japan and Southeast Asian nation will be expected and ore deposit of Krivoy Rog mine of almost 18 billion tons are considered, the supply from the Krivoy Rog mine is expected to grow. Therefore, this report assumes the following growth rates for the southbound and northbound transit volume.

Annal Growth Rate (1978 ~ 2000)

northbound	2.5%
southbound	3.0%

As a result, the following figures are obtained. (see, Table 4-3-7) The above figures from Australia include a draft estimation after the completion of the first project, therefore, the figures in 1978 show the potential transit volume.

Table 4-3-5 Inter-Regional Iron Ore Seaborne Trade

(10³ M/T)

From	To	UK/cont.	Mediterranean	Other Europe	U.S.A.	Japan	World	rate of increase (%)
Scandinavia	1975	18,607	300	4,028	239	—	23,496	△ 34.7
	76	19,869	70	3,776	602	—	24,427	4.0
	77	16,517	—	4,534	155	—	21,249	△ 13.0
	78	18,883	—	5,367	567	—	25,999	22.4
	79							
Other Europe	1975	4,072	2,015	533	270	1,243	8,136	△ 5.2
	76	3,077	1,640	576	47	1,082	6,428	△ 21.0
	77	2,759	1,601	212	87	968	5,628	△ 12.4
	78	3,546	1,497	145	—	1,084	6,324	12.4
	79							
North Africa	1975	439	151	813	—	—	1,617	△ 40.9
	76	259	456	750	11	—	1,676	3.6
	77	230	68	400	27	81	906	△ 45.9
	78	890	247	300	—	—	1,537	69.7
	79							
East Africa	1975	17,121	4,144	1,129	2,752	3,841	29,187	△ 31.4
	76	17,169	4,014	1,165	2,187	2,088	26,773	△ 8.3
	77	15,725	4,224	857	1,820	1,490	24,216	△ 9.5
	78	15,402	4,570	1,030	2,205	632	24,139	△ 0.3
	79							
South East Africa	1975	365	—	200	244	3,529	4,338	△ 19.6
	76	524	270	327	164	4,190	5,490	26.6
	77	4,639	620	200	254	6,944	12,657	130.6
	78	6,337	1,231	—	96	6,877	14,962	18.2
	79							
North America	1975	8,882	1,992	814	6,300	3,900	21,927	△ 9.1
	76	12,289	2,098	1,203	7,600	5,636	28,855	31.6
	77	10,131	2,060	799	7,500	3,639	24,582	△ 14.8
	78	8,539	1,721	523	6,300	2,476	19,758	△ 19.6
	79							
S. America Atl.	1975	24,987	5,655	5,383	20,993	23,460	82,367	△ 0.4
	76	27,567	5,542	5,315	14,619	25,380	79,617	△ 3.3
	77	22,132	6,036	5,637	8,555	23,912	67,678	△ 15.0
	78	24,804	5,458	7,503	10,245	20,815	72,512	7.1
	79							
S. America Pac.	1975	1,305	—	—	2,523	10,789	14,917	△ 22.0
	76	211	100	—	1,344	10,081	11,986	△ 19.6
	77	678	—	64	1,610	9,694	12,046	0.5
	78	216	—	—	1,226	8,716	11,017	△ 8.5
	79							
Asia	1975	1,126	100	1,900	238	19,138	22,702	△ 1.2
	76	565	—	1,700	136	18,836	21,437	△ 5.6
	77	557	—	1,150	—	20,210	22,117	3.2
	78	25	764	1,150	—	18,090	21,278	△ 3.8
	79							
Australia	1975	11,902	3,084	500	816	65,756	82,958	△ 1.4
	76	12,812	2,818	654	626	66,434	85,960	3.6
	77	10,078	1,523	591	310	65,649	82,487	△ 4.0
	78	12,418	1,533	737	268	55,958	80,847	△ 2.0
	79							
World	1975	88,869	17,651	15,300	34,375	131,656	291,918	△ 11.3
	76	94,624	17,845	15,469	27,336	133,727	293,768	0.6
	77	84,650	16,884	14,444	20,318	132,587	275,522	△ 6.2
	78	91,072	17,021	16,755	20,907	114,648	278,385	1.0
	79							
	1975	△ 23.3	△ 8.9	6.5	△ 2.6	△ 7.3	11.3	
	76	6.5	1.1	1.1	△ 20.5	1.6	△ 0.6	
	77	△ 10.5	△ 5.4	△ 6.6	△ 25.7	△ 0.8	△ 6.2	
	78	7.6	0.8	16.0	2.9	△ 13.5	1.0	
	79							

Source: Fearnley & Egers "World Bulk Trades".

Table 4-3-6 Ore and Metals Northbound & Southbound Traffic

(10³ M/T)

Southbound	Ores & Metals			Northbound	Ores & Metals		
	1976	1977	1978		1976	1977	1978
Loading Regions:				Loading Regions:			
North & West Europe & U.K. Ports	84	53	400	Red Sea Ports	76	4	25
Baltic Sea Ports	-	-	-	East Africa & Aden	647	580	374
North Mediterranean Ports	246	245	115	India, Pakistan, Burma & Sri Lanka	4,467	3,942	4,029
East & S.E. Mediterranean Ports	128	70	97	Arabian Gulf Ports	214	113	243
West & S.W. Mediterranean Ports	8	69	41	South East Asia & Sunda Islands	1,044	378	495
Black Sea Ports	848	892	922	Far East	5,238	701	365
American Ports	10	10	6	Australia	2,500	1,477	1,671
Others	2	2	-	Others	23	17	1
Total	1,326	1,341	1,581	Total	14,209	7,302	7,203
Unloading Regions:				Unloading Regions:			
Red Sea Ports	23	1	60	North & West Europe & U.K. Ports	3,818	1,421	1,196
East Africa & Aden	26	25	23	Baltic Sea Ports	699	746	357
India, Pakistan, Burma & Sri Lanka	17	65	31	North Mediterranean Ports	3,531	2,128	2,227
Arabian Gulf Ports	36	92	427	East & S.E. Mediterranean Ports	1,423	162	44
South East Asia & Sunda Islands	16	57	50	West & S.W. Mediterranean Ports	624	136	83
Far East	1,204	1,097	990	Black Sea Ports	3,764	2,634	3,219
Australia	-	3	-	American Ports	225	66	59
Others	4	1	-	Others	125	9	18
Total	1,326	1,341	1,581	Total	14,209	7,302	7,203

Table 4-3-7 Expected Volume of Iron Ore through the Suez Canal

	(10 ³ M/T)				
	1978	1985	1990	1995	2000
Southbound	1,000	1,230	1,426	1,653	1,916
North- (from India)	1,939	2,305	2,608	2,951	3,339
bound (from Australia)	14,688	17,460	19,754	22,350	25,287

3-4-3 Coal

The world production of coal in 1978 was 2661.5 million tons and the major producers were the U.S.S.R., China, USA, Poland, UK, West Germany, South Africa and Australia. Consuming areas, mostly as raw material for steel production were West European nations, Mediterranean nations and Japan.

The trend of the seaborne trade volume as given in the statistics of Fearnley and Egers are given as follows:

1976	126.8 (10 ⁶ M/T)
1977	131.9
1978	126.5

And the OD Table related to the Suez Canal is as follows:

Coal Seaborne trade Matrix connected with Suez Canal (10³ M/T)

	1976	1977	1978
From Australia to U.K. Cont, & Medit. and Other Europe	4,017	6,706	6,733
From East and Other Europe to Japan	2,354	2,122	998

In this table, the northbound trade includes Australian coal for Europe and the southbound includes East European coal for Japan.

The following table shows the transit volume of coal by direction as given in the Suez Canal Report.

	Transit volume of coal 1976-1978 (10 ³ M/T)		
	1976	1977	1978
Northbound	510 (12.7%)	841 (12.5%)	1,543 (22.9%)
Southbound	238 (10%)	331 (15.6%)	272 (27.3%)
Total	748	1,172	1,815

The Suez Canal's, share of world seaborne coal transit is presently less than 1%.

However, in the related routes, as shown in the parentheses in the above table, the Canal transit rates of the routes exceed 10%. Most spectacularly, in 1978, the share rapidly increased to

27% and 23% respectively for southbound and northbound.

Table 4-3-10 shows the Canal transit volume of coal and coke by loading and unloading area.

As regards the future trend, iron and steel industries are stepping up their strategy to restrain oil consumption, fearing a cost hike. For example, the five major blast furnace mills in Japan used to feed over 60 kg of heavy oil to the blast furnace per ton of pig iron, but they tried to reduce the amount to 25 kg in January–March 1979. To reduce 1 kg of blasting oil, 1.2 kg of coke is used, this leads to greater dependence on coal.

According to "Steam Coal Prospects to 2000" published in 1978 by OECD (the prospect of supply of and demand for energy coal and related problems are discussed in detail using data provided by participating nations), price increase of coal is slower than the drastic price increase of oil and natural gas, because coal has higher potential for production increase. There is moreover an inevitable trend towards the expanded use of coal. Entering the era of \$30 oil, coal has come to be considered again in the electric power industry which is turning rapidly to coal energy. At the recent international conference titled "Bulk Shipping in the 1980s" held in London, Dr. Hank Michael of Shell Coal International announced that the world seaborne trade of coal would increase from the present 155 million tons to 272 million tons in 1985, or a 74% increase, and to 700 million tons at the end of the century. Dr. Michael continued, the annual growth rate of seaborne trade of coal will be over 9% until 1985, that of steel material 4% and that of energy coal 18% until 1985 and 6.5% from 1985 to the end of the century (metallurgical coal 2.4%, energy coal 9.5%). This forecast was based not on the growth estimate of the steel industry and world economy but on the demand increase for energy coal by electric power plants, or the future strategy of energy demand and supply.

In consideration of the foregoing, the annual growth rate of coal transit through the Suez Canal was estimated as follows:

Year	Southbound	Northbound	
		(Energy Coal)	(Metallurgical Coal)
1978 – 1985	3%	18%	2.5%
1985 – 1990	"	9.5%	"
1990 – 1995	"	5%	"
1995 – 2000	"	5%	"

The following transit volume was obtained as a result.

Year	Southbound	Northbound	
		(Energy Coal)	(Metallurgical Coal)
1978	272	2,620	5,220
1980	288	3,648	5,485
1985	334	8,345	6,205

Here, 76% of 6,733 million tons shown in the F & E statistics "Australia/Western and Other Europe" route is assumed as metallurgical coal. 1 million tons, consisting of the balance 24%, including the latest purchases from Australia, is assumed to be energy coal.

60% of coal from Australia is transported by large vessels of over 60,000 DWT and the type

of ships to be used in future and the selection of routes will be discussed in the following chapter. And the initial figure in 1978 shows the potential transit volume. Consideration of the transit share of the Suez Canal will be made in the sensitivity analysis.

Table 4-3-8 Inter-Regional Coal Seaborne Trade

(10³ M/T)

To	From	East Europe	Other Europe	North America	Australia	Other	World	(%)
UK/Continent	1975	9,506	1,964	9,973	4,701	1,716	27,860	13.1
	76	11,042	1,541	10,467	3,068	2,884	29,002	4.1
	77	10,766	2,246	6,921	5,410	6,870	32,183	11.0
	78	9,770	2,083	5,029	4,636	9,532	31,050	Δ 3.5
	79							
Mediterranean	1975	4,538	3,241	4,395	1,791	347	14,312	8.4
	76	5,091	2,420	4,626	949	77	13,163	Δ 8.0
	77	4,120	2,357	4,841	1,296	1,000	13,614	3.4
	78	4,531	2,939	3,749	1,205	866	13,290	Δ 2.4
	79							
Other Europe	1975	10,880	559	3,910	119	53	15,521	19.1
	76	9,873	654	3,931	348	156	14,962	Δ 3.6
	77	11,121	1,574	3,635	131	490	16,951	13.3
	78	10,999	2,383	2,773	892	965	18,012	6.3
	79							
South America	1975	1,192	—	2,972	199	—	4,363	49.9
	76	1,550	—	2,659	—	—	4,209	Δ 3.5
	77	1,677	—	3,746	—	—	5,423	28.8
	78	1,425	—	3,048	—	—	4,473	Δ 17.5
	79							
Japan	1975	1,453	392	33,828	23,001	4,135	62,809	Δ 1.6
	76	1,972	382	27,657	26,309	4,234	60,554	Δ 3.6
	77	1,727	359	25,548	26,516	6,221	60,371	Δ 0.3
	78	998	—	20,016	24,262	5,760	51,036	Δ 15.5
	79							
World	1975	28,196	6,184	56,061	30,446	6,481	127,368	6.9
	76	30,729	5,029	50,816	31,956	8,260	126,790	Δ 0.5
	77	29,951	6,510	46,145	34,461	14,781	131,848	4.0
	78	28,401	7,795	36,381	35,283	18,666	126,526	Δ 4.0
	79							
	1975	Δ 0.2	2.1	6.6	16.6	5.5	6.9	
	76	9.0	Δ 18.7	Δ 9.4	5.0	27.4	Δ 0.5	
	77	Δ 2.5	29.5	Δ 9.2	7.8	79.0	4.0	
	78	Δ 5.2	19.7	Δ 21.2	2.4	26.3	Δ 4.0	
	79							

Source: Fearnley & Egers "World Bulk Trades".

Table 4-3-9 Volume of Coal Production

(10³ M/T)

Country	Year	1974	1975	1976	1977	1978
EC 9 Countries		235,973	250,548	247,797	240,545	238,065
of which West Germany		94,876	92,789	96,325	91,310	90,104
France		22,895	22,412	21,852	21,292	19,639
England		109,218	127,819	122,302	120,820	121,696
Portland		162,004	171,625	179,303	186,112	192,662
USSR		473,374	484,675	494,377	499,768	555,600
China		430,000	470,000	440,000	490,000	600,000
India		83,928	95,900	101,900	101,300	101,300
America		539,138	557,921	598,513	606,918	565,467
South Africa		65,018	66,057	74,600	85,398	90,600
Australia		59,833	67,019	74,948	72,400	74,950
World		2,227,270	2,349,000	2,394,019	2,472,269	2,614,830

Source: U.S. Mine Bureau, "International Coal Trade 1978"

Table 4-3-10 Transit Volume of Coal and Coke by Major Loading and Unloading Countries

Major loading countries (10³ M/T)

	1976	1977	1978
Australia	—	—	874
China	—	—	261
India	—	—	166
Singapore	—	—	151
Vietnam	—	—	77
Poland	160	—	—
Germany (Fed.)	49	—	—
U.S.A.	21	—	—
Others	8	—	14
Total	238	841	1,543

Major unloading countries (10³ M/T)

	1976	1977	1978
Romania	—	—	1,143
Greece	—	—	180
France	—	—	130
Netherlands	—	—	52
Japan	95	—	—
North Korea	41	—	—
Tanzania	31	—	—
Bahrain	21	—	—
Pakistan	14	—	—
Bangladesh	14	—	—
Others	22	—	38
Total	238	841	1,543

Source: Suez Canal Report

Table 4-3-11 Expected Volume of Coal through the Suez Canal

(10 ³ M/T)				
Year	Regions	Southbound	Northbound	
			Energy Coal	Metallurgical Coal
1978		272	2,620	5,220
1980		288	3,648	5,485
1985		334	8,345	6,205
1990		388	13,136	7,021
1995		449	16,766	7,943
2000		521	21,398	8,987

3-4-4 Cereals

As shown in Table 4-3-13, world seaborne trade of cereals amounted to 169 million tons in 1978 and the main supply sources were the U.S., Canada, Western Europe, Argentina and Australia. Major importing countries were West European nations, Japan, North African countries, Middle East countries, South American countries, Southwest Asia and Southeast Asian countries.

The routes related to the Suez Canal are from the U.S.A. & Canada to Middle East; from U.S.A. and Canada to the Indian Ocean for the southbound routes. In case of Canada and U.S.A., shipments from the Pacific coast of grains to Middle East, India, Pakistan and Southeast Asia do not use the canal.

In addition, some grain in sacks is being exported from Western Europe to the above areas.

In the case of northbound traffic, cereals, mostly rice, are being shipped from Southeast Asia to Western Europe but OD figures are not observed in the F & E data. Therefore, it is necessary to prepare OD table. It is also necessary to estimate the shipment ratio from the Pacific coast and the Atlantic coast of U.S. and Canada. The ratio is calculated from the Dry Cargo Fixture Report of H.P. Drewry as follows:

To	From	U.S. Gulf: U.S.N.H.	U.S.N.P.
		Great Lakes and St. Laurence	Calif. & Vancouver
Middle East		75.5%	57.0%
Indian Ocean		24.5%	43.0%

Next, the figures of transit cereals through the Canal using the distribution ratio of the routes are rewritten as shown in Table 4-3-12.

The actual transit volume of southbound cereals from American ports in 1978 was 3.149 million tons. From this figure, the shipment from the east coast of the US and Canada to the Middle East and Indian Ocean is estimated at 2.375 million tons and 0.772 million tons respectively or a total of 3.149 million tons. From the F & E statistics, the amount of shipment of cereals from the east coast of US and Canada to Middle East and Indian Ocean is estimated at 3.393 million tons in 1978, close to the SCA value.

For the future estimate, in case of southbound, Middle East Area 3.14 million tons, South East Asia area 2.1 million tons for 1978 were used for the initial figures and for northbound 1.1 million tons for the same year was used.

The basis for estimate was derived from the "FAO Conference C79/24, Agricultural towards 2000", and import volume, domestic production capacity and import dependency in the south bound cereals demand areas were considered. On the other hand, the supply sources to these demand areas will not be changed, and future annual demand ratio was made till 2,000 as follows:

	Southbound		Northbound
	of which Southeast Asia Area	of which Middle East Area	
1978 - 1985	6.0%	4.9%	3.0%
1986 - 1990	6.5%	4.9%	3.0%
1991 - 1995	3.9%	5.0%	3.0%
1996 - 2000	3.9%	5.0%	3.0%

For northbound, the foregoing growth rates were set based upon past trends.

The cereal transit volume of the Suez Canal is in Table 4-3-15.

At present, 79% of vessels carrying grains are less than 40,000 DWT in the case of Southeast Asia (mostly 10,200 - 10,500 DWT) and 40,000 DWT and above vessels are only 21%.

The type of vessel will be further discussed in the section on vessel distribution.

Table 4-3-12 Volume of Transit Cereals

(10³ M/T)

	North and South bound Total	Northbound cereals	Southbound cereals		
			Southbound Total	of which from pacific coast of Canada & U.S.	of which from other regions
1976	7,855	2,712	5,143	3,347	1,796
1977	5,780	1,592	4,188	2,413	1,775
1978	6,360	1,139	5,221	3,009	2,212

Source: Suez Canal Report

Table 4-3-13 Inter-Regional Cereals Seaborne Trade

(10³ M/T)

To	From	U.S.A.	Canada	Argentina	Australia	Others	World	rate of increase (%)
UK/Continent	1975	17,791	1,763	308	68	7,189	27,119	7.6
	76	21,798	2,569	941	285	6,020	31,613	16.6
	77	20,327	2,477	2,017	679	4,936	30,436	Δ 3.7
	78	19,899	2,341	1,612	139	3,959	27,950	Δ 8.2
	79							
Mediterranean	1975	8,096	1,419	2,177	17	507	12,216	Δ 23.9
	76	8,329	1,535	2,223	—	2,583	14,670	20.1
	77	7,239	1,723	3,457	12	2,843	15,274	4.1
	78	8,852	1,060	3,711	—	3,619	17,242	12.9
	79							
East Europe	1975	9,995	3,794	1,826	1,113	789	17,517	167.7
	76	16,056	4,048	1,682	2,570	2,265	26,621	52.0
	77	10,130	2,870	2,900	1,346	1,619	18,865	Δ 29.1
	78	18,513	4,781	3,432	911	1,939	29,576	56.8
	79							
Other Europe	1975	3,915	119	89	541	913	5,577	37.1
	76	2,718	170	44	—	668	3,600	Δ 35.4
	77	4,099	250	450	—	521	5,320	47.8
	78	3,342	100	130	6	469	4,047	Δ 23.9
	79							
Africa	1975	3,656	283	328	1,080	2,240	7,587	3.8
	76	4,502	406	230	1,140	1,421	7,699	1.5
	77	4,908	1,379	300	1,392	769	8,748	13.6
	78	7,685	1,003	133	1,145	1,504	11,470	31.1
	79							
Americas	1975	8,303	676	1,728	97	81	10,885	Δ 4.5
	76	6,782	1,780	1,667	—	412	10,641	Δ 2.2
	77	8,674	1,571	2,364	123	391	13,123	23.3
	78	13,191	2,417	949	79	530	17,166	30.8
	79							
Near East	1975	2,270	229	—	136	27	2,662	43.0
	76	2,027	231	—	200	41	2,499	Δ 6.1
	77	2,300	515	—	—	37	2,852	14.1
	78	2,367	320	98	—	79	2,864	0.4
	79							
Indian Ocean	1975	7,146	1,293	8	2,113	2,009	12,569	40.4
	76	5,468	607	—	1,310	723	8,108	Δ 35.5
	77	2,412	901	—	1,848	448	5,609	Δ 30.8
	78	4,560	1,010	223	1,315	826	7,934	41.5
	79							
Japan	1975	13,172	2,325	756	2,810	2,551	21,614	Δ 3.7
	76	15,234	2,589	1,016	2,656	2,414	23,909	10.6
	77	17,010	2,321	2,400	2,516	1,586	25,833	8.1
	78	18,004	2,063	2,587	1,959	2,169	26,782	3.7
	79							
Other Far East	1975	5,400	2,051	172	2,737	1,086	11,446	Δ 26.2
	76	6,216	1,326	—	2,769	767	11,078	Δ 3.2
	77	7,391	3,374	650	4,662	718	16,795	51.6
	78	12,442	3,504	713	3,927	933	21,519	28.1
	79							
World	1975	83,776	14,884	7,732	11,584	19,226	137,202	5.8
	76	92,089	15,266	8,064	11,930	19,036	146,385	6.7
	77	87,703	17,384	14,838	12,629	14,778	147,332	0.7
	78	110,251	18,605	13,588	9,559	17,258	169,261	14.9
	79							
	1975	7.8	14.8	Δ 16.9	21.0	Δ 4.5	5.8	
	76	9.9	2.6	4.3	3.0	Δ 1.0	6.7	
	77	Δ 4.8	13.9	84.0	5.9	Δ 22.4	0.7	
	78	25.7	7.0	Δ 8.4	Δ 24.3	16.8	14.9	
	79							

Source: Fearnley & Eggers "World Bulk Trades".

Table 4-3-14 Transit Volume of Cereals by Major Loading and Unloading Countries

	1976	1977	1978
Major Loading Countries (10³ M/T)			
U.S.A.	3,051	1,687	2,276
Canada	296	726	733
France	871	355	627
Italy	160	172	245
Turkey	—	—	216
Belgium	161	369	142
Netherlands	109	142	—
Germany (Fed.)	—	75	—
Bulgaria	—	68	—
Greece	—	47	—
Finland	—	47	—
England	29	—	—
Others	466	456	982
Total	5,143	4,188	5,221
Major Unloading Countries (10³ M/T)			
Iraq	164	569	763
Iran	736	545	668
Pakistan	118	98	663
Bangladesh	249	522	553
Saudi Arabia	281	426	445
Jordan	249	242	266
Sudan	147	99	235
Vietnam	—	234	231
Sri Lanka	272	355	231
Ethiopia	—	75	160
India	1,978	240	105
Tanzania	45	95	—
Indonesia	136	78	—
Philippines	64	73	—
North Yemen	—	73	—
Others	569	465	901
Total	5,143	4,188	5,221

Source: Suez Canal Report

Table 4-3-15 Expected Volume of Cereals Through the Suez Canal

(10³ M/T)

Year	Southbound		Northbound
	To Asian Area	To Middle East Area	
1978	2,081	3,140	1,139
1980	2,338	3,455	1,209
1985	3,129	4,388	1,401
1990	4,280	5,574	1,624
1995	5,190	7,114	1,883
2000	6,284	9,080	2,183

3-4-5 Fertilizer

- (1) The Canal transit volume of mineral fertilizer reached 9,025 thousand tons in 1978, an increase of 46% over 1977 of which phosphate recorded 2,717 thousand tons, potash 855 thousand tons, urea and other nitrogen fertilizers 3,114 thousand tons and others. (Table 4-3-20)

Loading countries are USA and European countries including Rumania, among which no outstanding figures are observed. 55% of fertilizer traffic are destined for India and China and the balance is shared by countries with large populations such as Pakistan and Iran. The following gives an analysis of phosphate, potash and nitrogen fertilizers.

(2) Phosphate

- Consumption of phosphate fertilizers in India, China, Iran and Pakistan in 1977/1978 fertilizer year was 2,653 thousand tons P₂O₅ (phosphoric acid) equivalent 10.7% annual rate of increase from 1970/1971. (Table 4-3-21)
Production was 2,181 thousand tons, with annual growth rate of 11.2% in the same period.
- In this period, world consumption and production increased at an annual rate of 4.4% and 4.7% respectively.

World phosphate rock production & Seaborne Trade

	1970	1971	1972	1973	1974	1975	1976	1977	1978
Production	82	85	91	99	117	118	118	118	n.a.
Seaborne Trade	32	35	38	43	48	38	37	44	47

Detailed data for the Origin/Destination matrix with regard to import into China and export from USSR is not available.

Also, it is not known whether imports from USA to Asian countries are through Suez or Panama.

Of the above four countries, China is considered to have purchased phosphate rock

mostly from USA through Panama for geographical and political reasons. The other three countries import mostly from USA and Morocco via Suez and partly from Jordan as their production of phosphate in 1977 was only 740 thousand tons (220 thousand tons P_2O_5 equivalent).

- 3) Future imports of phosphate rock are considered to increase nearly in proportion to the production and consumption of P_2O_5 in those countries.

According to the forecast "World Fertilizers Situation and Outlook 1978 -- '85" made by the International Fertilizer Development Center and the Tennessee Valley Authority, USA, production is estimated to increase yearly by 8.3% from 1978 to '85 and consumption by 6.2%.

As the increase includes low growth for Japan, the growth rate of developing nations in South and Western Asia is estimated rather higher.

- 4) Every nation in this area is making efforts in their agricultural policy to increase production of food and reduce imports, and for this reason demand for fertilizers is expected to increase in the future.

From the foregoing viewpoints, the annual growth rate is estimated at 8% up to 1990 and 6% thereafter.

As for resources of raw materials, it is generally considered that there are ample supplies of phosphate rock for the foreseeable future. Current reserves are estimated at 144 billion tons of equivalent 30 per cent P_2O_5 grade, which are compared with 120 million tons of world production in 1977.

- 5) Based on the estimated growth rate, the future southbound traffic of phosphate fertilizer is calculated as follows:

					(10 ³ M/T)
Year	1978	1985	1990	1995	2000
Traffic	3,601	6,171	9,067	12,134	16,348

Note: 1978 figure includes a part of "others" in the traffic record

(3) Potassium

- 1) Production and consumption of potassium are small compared with other fertilizers, and the canal transit volume is also small.

Four countries, China, India, Iran and Pakistan, consumed 1,011 thousand tons in 1977/'78, an annual increase of 9.0% from '70/'71.

- 2) The seaborne trade matrix of potassium is not clear as phosphate.

Supply sources to Asia are USSR, East and West Germany, and Canada (west coast). Japan imports about 40% from Canada, about 20% from USSR and the balance from Europe, USA and other countries.

- 3) According to the above "World Fertilizer Situation and Outlook 1978 -- '85", the consumption and production of potassium fertilizer in Asia for this period are estimated to grow at an annual rate of 5.2%. As in the case of phosphate, 6% is estimated up to 1990 and 5% thereafter.

4) Future traffic of potassium is calculated as follows:

	(10 ³ M/T)				
Year	1978	1985	1990	1995	2000
Traffic	1,154	1,736	2,323	2,964	3,783

(4) Nitrogenous Fertilizer

- 1) Consumption and production of 6 countries, China, India, Iran, Iraq, Pakistan and Bangladesh increased at an annual rate of 10.0% and 16.4% during the 7 years from 1970/71 to 1977/78, reaching 9,827 thousand and 7,316 thousand tons respectively. Especially production grew remarkably and the self-sufficiency rate in these countries increased from 50% in 70/71 to 74% in 77/78.

Meanwhile, as China increased consumption by 28% in 76/77 – 77/78, and the volume of imports temporarily increased, therefore her self-sufficiency rate, which had once increased to 79% in 76/77, declined. For the long term, however, the self-sufficiency rate is certainly on the uptrend. In many countries located to the east of the canal, including China and India, many fertilizer plants are being constructed, adding 8 million tons per year to their present production capacity.

- 2) According to the said "World Fertilizer Situation and Outlook 1978 – 1985", the annual growth rate of consumption and production of nitrogenous fertilizer are estimated at 6.5% and 8.3% respectively.

For the same reason as in the case of other fertilizers, the increase of consumption up to 1990 is estimated at 8% and thereafter 6%. On the other hand, a decrease of imports due to an improving rate of self-sufficiency is calculated, with 100 for 1977. Imports will decrease every year until 1985 at 8% per year, at 3% until 1990 and thereafter at 1%. The canal transit volume is estimated by taking account of the increase of consumption and decrease of import rate.

- 3) Future traffic of nitrogenous fertilizer is calculated as follows:

	(10 ³ M/T)				
Year	1978	1985	1990	1995	2000
Traffic	4,204	2,819	1,841	1,386	824

**Table 4-3-16 Transit Volume of Fertilizers by Major Loading
and Unloading Countries**

(10³ M/T)

	1976	1977	1978
Phosphate	1,332	2,137	2,717
Urea	1,231	1,354	2,355
Potass	588	812	855
Ammonium sulphate	545	431	393
Ammonium nitrate	252	216	366
Others	1,544	1,247	2,339
Total	5,492	6,197	9,025
LOADING COUNTRIES			
U.S.A.	609	947	1,209
Germany (Fed.)	448	807	919
Romania	646	772	1,289
Morocco	417	769	906
Russia	395	640	365
Belgium	485	365	1,136
Netherlands	416	352	579
Bulgaria	207	220	259
Italy	280	193	569
Others	1,589	1,132	1,791
Total	5,492	6,197	9,025
UNLOADING COUNTRIES			
India	1,498	2,104	2,987
China	1,309	1,329	1,935
Iran	186	422	562
Japan	—	340	444
Singapore	94	242	415
Thailand	292	236	222
Pakistan	389	182	617
Others	1,724	1,342	1,845
Total	5,492	6,197	9,025

Source: Suez Canal Report

Table 4-3-17 Consumption of Phosphate Fertilizers

(10³ M/T)

	1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78
India	462.0	565.0	581.0	649.9	471.0	466.8	635.3	867.5
China	780.0	917.0	1,043.5	1,260.1	1,324.2	1,253.4	1,354.8	1,492.7
Iran	29.3	69.3	75.8	133.3	141.4	142.5	161.5	136.8
Pakistan	30.5	37.2	48.7	58.1	60.5	108.5	117.9	155.6
Japan	655.9	661.4	729.7	793.0	692.4	623.3	737.0	747.0
Bangladesh	34.8	27.7	41.6	43.8	35.6	54.3	61.1	90.6
Indonesia	32.0	26.1	73.3	93.4	121.0	122.2	111.4	111.8
Thailand	23.5	43.3	55.9	51.4	70.4	62.2	80.3	90.0

Source: FAO "Fertilizer Yearbook 1978"

Table 4-3-18 Production & Exports of Phosphate Rock

(10³ M/T)

	1970	1971	1972	1973	1974	1975	1976	1977
U.S.A.								
Production	35,143	35,277	37,041	38,226	41,446	44,276	44,662	47,256
Exports			12,693	12,639	12,889	11,447	9,996	13,050
U.S.S.R.								
Production	17,800	19,000	19,700	21,200	22,500	24,150	24,200	24,200
Exports			6,200	6,600	6,000	5,830	4,870	4,243
Morocco								
Production	11,424	12,030	15,105	17,077	19,750	14,119	15,656	17,572
Exports			13,581	16,109	18,692	13,110	14,650	15,784
Jordan								
Production	913	651	714	1,081	1,675	1,353	1,768	1,759
Exports			952	1,089	1,469	1,112	1,653	1,788

Source: FAO "Fertilizer Yearbook 1978"

Table 4-3-19 Consumption of Potash Fertilizers

(10³ M/T)

	1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78
India	228.2	303.0	347.0	359.9	336.0	278.3	318.6	505.0
China	325.0	345.0	375.7	522.7	547.2	410.1	423.7	497.5
Iran	0.4	0.4	0.9	1.1	2.6	3.5	2.7	2.5
Pakistan	1.2	0.7	1.4	2.7	2.1	1.9	2.7	6.2

Source: FAO "Fertilizer Yearbook 1978"

Table 4-3-20 Production & Exports of Potash (K₂O content) 1970 - 1977(10³ M/T)

	1970	1971	1972	1973	1974	1975	1976	1977
Canada								
Production	3,103	3,629	3,494	4,453	5,776	4,674	5,215	5,910
Exports					4,971	4,263	5,362	5,828
France								
Production	1,904	2,000	1,760	2,263	2,275	2,085	1,738	1,719
Exports					884	617	694	660
German Dem. Rep.								
Production	2,420	2,445	2,458	2,556	2,864	3,019	3,161	3,244
Exports					2,089	2,252	2,428	2,740
Germany, Fed. Rep. of								
Production	2,645	2,815	2,845	2,975	3,090	2,607	2,441	2,838
Exports					1,210	819	1,082	1,249
USSR								
Production	4,087	4,807	5,433	5,900	6,586	7,900	8,500	8,500
Exports					2,321	2,490	2,316	2,506
United States								
Production	2,476	2,347	2,412	2,361	2,315	2,269	2,177	2,229
Exports					770	826	902	891

Source: Production - U.N. "Statistical Yearbook" Exports - FAO "Fertilizer Yearbook 1978"

**Table 4-3-21 Production and Consumption of Nitrogenous Fertilizer
in Asia & Middle East Countries**

(10³ M/T)

		70/71	71/72	72/73	73/74	74/75	75/76	76/77	77/78
China	(C)	3,115.0	3,141.0	3,459	4,015	4,000	4,360.6	4,598.4	5,900.0
	(P)	1,426	1,853	2,245	2,791	3,090	3,172.1	3,842	4,600
India	(C)	1,487.1	1,760	1,839	1,829.1	1,766	2,148.6	2,457.1	2,914.6
	(P)	838	946	1,054	1,049.9	1,186.6	1,508.6	1,862.4	1,999.7
Iran	(C)	65.3	107.3	123.8	194.1	188.5	190.0	220.5	189.2
	(P)	30.9	86.2	142.8	130.8	131.0	125.7	136.2	177.9
Iraq	(C)	12.0	13.5	15.0	20.1	27.3	25.0	35.0	45.0
	(P)	6.0	10.7	26.2	28.1	33.6	24.3	25.3	125.5
Pakistan	(C)	251.5	344.0	386.2	341.9	362.9	443.5	511.0	555.1
	(P)	140.1	215.1	274.5	300.1	296.3	316.5	309.3	306.7
Bangladesh	(C)	97.7	78.1	129.3	127.0	82.8	146.7	165.8	223.2
	(P)	80.2	21.3	92.2	129.7	32.7	131.1	126.1	105.7
Total	(C)	5,028.6	5,443.9	5,952.3	6,527.2	6,427.5	7,314.4	7,987.8	9,827.1
	(P)	2,521.2	3,132.3	3,834.7	4,429.6	4,770.2	5,278.3	6,301.3	7,315.5
(P)/(C) %		50	58	64	68	74	72	79	74
(C) - (P)		2,507.4	2,311.6	2,117.6	2,097.6	1,657.3	2,036.1	1,686.5	2,511.6

Note: C ; Consumption P ; Production

Source: U.N. "Statistical Yearbook 1978"

Table 4-3-22 World Nitrogenous Fertilizer Consumption

	Total Consumption (10 ⁶ ton N)			Share of World Consumption (%)		
	1977	1980	1985	1977	1980	1985
North America	10.3	11.2	13.1	23	21	20
Latin America	2.3	2.9	4.1	5	5	6
Western Europe	8.0	8.8	10.0	18	16	15
Eastern Europe	4.4	5.4	6.7	10	10	10
USSR	7.3	9.1	11.6	16	17	17
Asia	11.2	14.2	18.5	25	26	28
Africa	1.4	1.7	2.3	3	3	3
Oceania	0.3	0.3	0.3	—	1	1
World	45.1	53.6	66.6	100	100	100

Source: European Chemical News, May 14, 1979

Table 4-3-23 World Nitrogenous Fertilizer Production

	(10 ⁶ ton N)		
	1977	1980 ^a	1985 ^a
North America	10.8	11.2	11.2
Latin America	1.3	2.5	3.8
Western Europe	9.2	10.1	10.6
Eastern Europe	5.8	6.9	8.1
USSR	8.5	12.2	17.8
Asia	9.4	12.5	17.8
Africa	0.7	1.1	2.0
Oceania	0.2	0.3	0.3
World	45.9	56.8	71.7

Note: Based on 90 per cent operating rates in developed countries and 70 per cent rates in developing countries.

Source: European Chemical News, May 14, 1979

Table 4-3-24 Production Capacity of Ammonia

	(10 ⁶ ton N)		
	1978	1980	1985
North America	17.3	17.4	17.4
Latin America	4.3	4.4	6.8
Western Europe	14.9	16.1	16.4
Eastern Europe	9.9	10.8	12.4
USSR	14.2	19.4	24.7
Asia	19.3	24.5	31.3
Africa	1.5	2.9	3.5
Oceania	0.4	0.4	0.4
World	81.9	96.0	112.9

Source: European Chemical News May 14, 1979

Table 4-3-25 Recent Ammonia Project in Asia

Country	Location	Start-up	Capacity (10 ³ M/T)
Kenya	Mombasa	1980/81	54
Sudan	Port Sudan	1982/83	108
Bangladesh	Ashuganj	1982/83	272
	Chittagong	1982/83	272
China	Anching - Hahwei	1977/78	272
	Canton - Kwangtung	1977/78	272
	Chishui - Kweichow	1977/78	272
	Nanking - Kiangsu	1978/79	272
	Shuifu - Yunan	1977/78	272
	Tsangzhou - Hopeh	1978/79	272
	Yueyang - Hunan	1978/79	272
	Zhijiang - Hupei	1978/79	272
India	Korba	1982/83	244
	Talcher	1978/79	244
	Ramargundam	1978/79	244
	Trombay	1979/80	244
	Sindri	1978/79	244
	Nangal	1977/78	244
	Haldia	1977/78	163
Indonesia	Tjikampek	1978/79	272
Iran	Shiraz	1980/81	326
Iraq	Basrah	1977/78	216
	Khor Al Zubair	1979/80	541
Japan	Niigata	1977/78	216
Korea, Rep.	Yosu	1977/78	244
Kuwait	Shuaiba	1982/83	272
Pakistan	Mirpur Mathelo	1978/79	272
	Multan	1977/78	247
Qatar	Um Said	1979/80	244
Sri Lanka	Colombo	1979/80	147

Source: FAO Fertilizer Yearbook.

3.4.6 Fabricated Metals

- (1) Southbound transit volume of fabricated metals reached 7,894 thousand tons in 1978, more than double that of the preceding year. Loading countries include Belgium for 1,125 thousand tons and other major European countries for less than 1 million tons. With regard to destination countries, China and Iran rapidly increased their volume of imports and the balance of traffic went to many Asian countries.

With regard to SCA classification of fabricated metals, most of them are steel products such as iron and steel, steel sheets and plates, pig and cast iron, etc. Here, analysis is made on steel products.

- (2) The consumption of steel by 11 Arab nations located to the east of the Canal increased from 2,321 thousand tons in 1970 to 10,667 thousand tons in 1976 at an annual growth rate of 28.9%. Per capita consumption for the total population of 67,333 thousand in 1976 was 158 kg.

Per capita consumption is compared with that of Japan as follows: (year indicated shows when the indicated consumption was reached.)

Per Capita Consumption of Crude Steel			
	50 kg	160 kg	600 kg
11 Countries in Middle East	1971	1976	(?)
	(5 years)	(?)	
Japan	1950	1959	1969
	(9 years)	(10 years)	

Japan, during this period of 19 years, showed an annual average growth rate of 15.4%.

- (3) Arab Federation of Steel Producers made a proposal in its bulletin "Acier Arabe" Nos. 67 and 68/1979 with regard to the future consumption and production plan by 22 participating nations. A realistic program presented therein proposes per capita consumption of 633 kg, which is equal to the current level in the developed countries, and matching production to be made by these Arab nations.
- (4) Nations located to the east of the Canal show a growth rate as high as 28.9% as mentioned before and will maintain a similar high growth rate naturally for several years. For example, a growth as high as Japan's 15.4% or more can be expected and with expected revenue increase from the hike of oil price, it will be economically feasible. Here, however, lower annual growth rates of 10% up to 1985 and 8% up to 1990 and 7% up to 2000 is estimated by taking into consideration the problems of labor from foreign countries, which now exceeds two million, and infrastructures.
- (5) According to the world steel trade statistics, 35% of imports by these 11 nations is via the Suez Canal, 15% is by land or mixed up in other commodities in SCA statistics and about 50% is supplied from Asian countries.

(6) With the start of operation of steel mills currently planned or under study in Iraq, Saudi Arabia and U.A.E., about 20% is estimated to be self-supplied in the area by 1985. As of 2000, when the self-sufficiency system is completed as proposed by the said Federation of Steel Producers, steel plants are expected to be located mainly on the Mediterranean side, such as Algeria and Libya, and for this reason the self sufficiency rate in the Arabian Gulf countries is estimated at 50%.

(7) In Asia and other areas, it is estimated that the growth rate will be lower than in the Arab nations, 8% up to 1985 and 7% up to 1990 and 5% thereafter, although demand increase stemming from China's modernization program is expected.

As of 1978, the supply rate via the Suez Canal was 21%. In view of the improvement of China's self-sufficiency rate in the near future, the self-sufficiency rate in these areas is estimated at 30% in 1985 and 75% in 2000.

(8) Northbound fabricated metals are decreasing due to Japan's voluntary control of exports to EC countries, but annual growth of 3% is estimated assuming gradual recovery in the long term.

(9) Future traffic of fabricated metals by direction is calculated as follows:

		(10 ³ ton)				
Year		1978	1985	1990	1995	2000
Traffic (S.B.)	Middle East	3,234	4,938	6,206	7,365	8,452
	Asia, etc.	4,477	5,435	5,829	5,293	4,017
	(N.B.)	3,054	3,756	4,354	5,048	5,852

**Table 4-3-26 (a) Northbound Transit Volume of Fabricated Metals
by Major Loading and Unloading Countries**

(10³ M/T)

	1976	1977	1978
LOADING COUNTRIES			
Japan	4,018	3,546	1,792
India	537	575	337
Australia	507	351	300
Singapore	397	—	152
China	59	—	48
Others	154	929	425
TOTAL	6,357	5,401	3,054
UNLOADING COUNTRIES			
Russia	1,399	888	701
Turkey	663	771	292
Belgium	622	401	298
Greece	447	311	264
Italy	351	441	146
Egypt	235	172	91
Spain	226	—	—
Netherlands	219	—	—
England	212	140	77
Romania	207	305	143
Poland	125	—	—
Others	1,651	1,972	1,042
TOTAL	6,357	5,401	3,054

Source: Suez Canal Report

**(b) Southbound Transit Volume of Fabricated Metals
by Major Loading and Unloading Countries**

(10³ M/T)

	1976	1977	1978
Iron & Steel	1,323	1,370	2,412
Sheets & Plates	773	704	1,195
Pig & Cast Iron	333	478	1,040
Others	1,315	1,341	3,247
TOTAL	3,744	3,893	7,894
LOADING COUNTRIES			
Russia	443	573	290
Italy	381	385	793
Belgium	298	365	1,125
Germany (Fed.)	245	296	784
England	202	255	508
U.S.A.	247	255	289
France	161	186	482
Netherlands	228	181	618
Poland	177	144	235
Spain	149	105	630
Others	1,214	1,148	2,140
TOTAL	3,744	3,893	7,894
UNLOADING COUNTRIES			
Iran	724	622	1,491
China	650	547	2,005
Japan	245	420	464
Saudi Arabia	111	303	528
Pakistan	155	236	136
India	163	173	406
Thailand	—	149	202
Vietnam	84	117	—
Singapore	—	96	248
Others		1,230	2,414
TOTAL	3,744	3,893	7,894

Source: Suez Canal Report

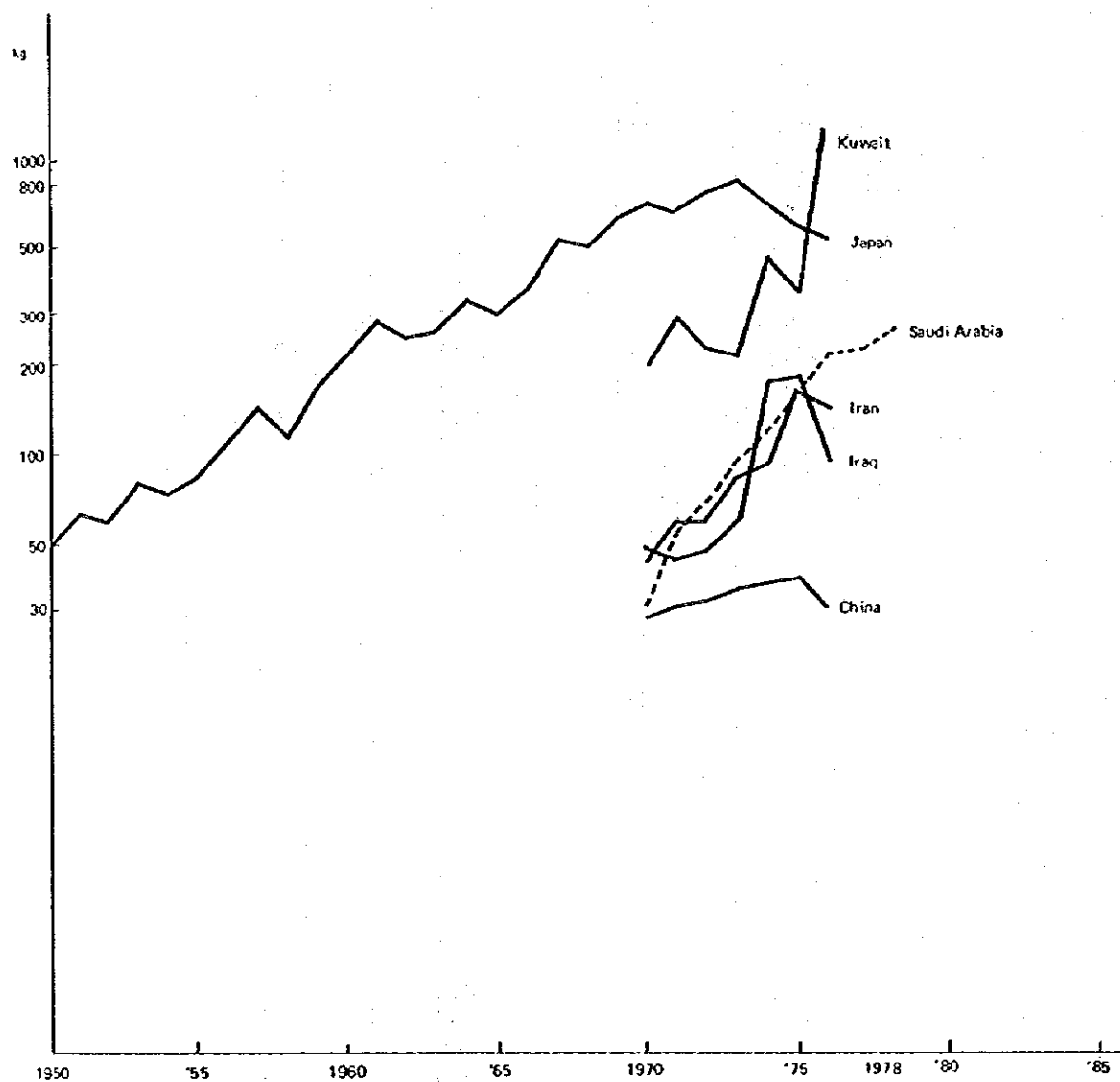


Fig. 4-3-3 Crude Steel Consumption per Capita

Table 4-3-27 Crude Steel Consumption of Selected Countries

	GNP per Capita (1976) (A)	Steel Consumption per Capita (1976) (B)	B/A kg/\$100	GNP per Capita Growth Rates 1970-1976	Steel Consumption per Capita Growth Rates 1970-1976
Iran	\$ 2,060	kg 147	7.1	8.2	22.7
Iraq	1,390	94	6.8	7.1	11.9
Saudi Arabia	4,420	216	4.9	9.5	39.0
Kuwait	13,960	1,140	8.2	-2.2	34.1
China	370	31	8.4	4.3	0.0
India	140	13	9.3	0.5	-1.2
Thailand	380	32	8.4	4.2	5.7
Japan	5,090	534	10.5	3.9	-0.5
Korea	700	151	21.6	8.7	21.9
Egypt	280	34	12.1	3.1	3.3
Algeria	1,010	71	7.0	3.8	5.0
Libya	5,970	310	5.2	-6.6	14.4
Portugal	1,660	156	9.4	2.8	9.0
Greece	2,570	176	6.8	4.1	9.9
Turkey	1,010	112	11.1	4.7	14.0
Germany	7,510	593	7.9	3.3	-1.8
Italy	3,220	387	12.0	3.8	-0.3
U.K.	4,180	407	9.7	2.7	-1.4
France	6,730	445	6.6	4.3	-0.4
Netherlands	6,650	368	5.5	3.8	-2.7
U.S.A.	7,880	604	7.7	2.4	-0.4
Canada	7,930	543	6.8	3.7	0.7
Venezuela	2,540	229	9.0	2.6	6.7
Brazil	1,300	98	7.5	7.4	4.1
Argentina	1,580	129	8.2	1.8	-3.2
Mexico	1,060	96	9.1	1.7	3.1
U.S.S.R.	2,800	566	20.2	3.1	3.7
Romania	1,400	464	33.1	10.1	7.9
Czechoslovakia	3,790	767	20.2	2.6	3.9
Yugoslavia	1,750	189	10.8	5.6	2.1
Poland	2,880	533	18.5	4.0	7.0

Source: World Bank "ATLAS 1978"

Japan Iron & Steel Ass. "Iron & Steel Handbook 1979"

**Table 4-3-28 Total Exports of Semi-Finished and Finished Steel Products
by Exporting Countries in 1965, 1970 and 1973 to 1978**

Exporting Countries	1965	1970	1973	1974	1975	1976	1977	1978
	(10 ³ M/T)							
Australia	332.0	1,098.0	1,396.0	1,238.2	1,727.2	3,260.2	2,481.8	2,573.3
Austria	1,135.7	1,369.2	1,436.2	1,722.8	1,966.1	2,010.8	1,990.8	2,154.5
Belgium - Luxembourg	9,516.0	12,534.0	15,968.0	16,608.0	12,624.0	12,676.0	12,070.0	13,262.0
Bulgaria	833.0	653.5	888.6	810.6	792.3	1,113.7	1,048.8	1,078.5
Canada	833.9	1,307.9	1,272.7	1,468.6	1,051.2	1,518.0	1,717.3	2,738.4
Czechoslovakia	2,044.6	2,591.3	2,898.9	3,044.2	3,217.8	3,361.8	3,412.8	3,595.8
Denmark	141.7	266.9	271.8	313.5	289.9	356.3	471.8	554.3
Finland	26.6	414.7	525.2	447.4	440.9	537.0	950.9	1,191.9
France	6,567.7	7,376.3	8,291.7	9,697.8	8,184.6	8,084.8	9,688.9	10,470.4
German Democratic Republic	—	396.0	1,695.0	1,836.0	1,517.0	1,491.0	1,654.0	1,580.0
Germany, Federal Republic of	9,546.8	12,044.1	17,263.5	22,324.4	16,272.2	15,070.5	15,438.0	18,516.9
Greece	35.1	180.0	311.3	440.3	333.6	354.4	221.8	461.2
Hungary	800.7	907.1	1,133.7	897.0	1,048.0	1,249.0	1,310.4	1,120.0
India	—	690.8	149.8	193.9	348.2	1,521.9	1,311.9	—
Ireland	54.6	13.4	54.0	27.7	27.6	33.8	31.7	59.2
Italy	2,435.3	1,750.7	3,451.3	4,749.7	6,263.2	6,029.0	6,723.0	8,248.5
Japan	9,746.0	17,589.0	24,805.0	32,219.9	28,942.3	36,016.0	33,628.0	30,924.6
Netherlands	1,904.6	3,144.0	4,073.0	4,353.8	3,431.8	3,798.6	4,149.6	4,638.3
Norway	339.0	470.1	628.7	587.3	586.4	627.6	484.3	594.4
Poland	938.7	1,492.4	1,402.4	1,469.6	1,485.2	1,578.9	1,794.1	1,922.8
Portugal	25.8	40.7	28.7	20.8	23.5	68.6	24.7	32.3
Romania	749.9	1,370.8	1,379.6	1,307.7	1,477.0	2,100.0	1,899.0	2,240.0
South Africa	97.2	392.7	631.5	611.6	324.0	1,085.4	2,096.1	2,214.6
Spain	17.2	253.4	1,711.9	799.8	1,580.0	2,442.9	2,677.9	4,117.1
Sweden	965.7	1,459.0	1,931.6	2,029.8	1,681.2	1,683.4	1,884.7	2,230.2
Switzerland	71.3	103.0	121.9	208.8	239.2	330.6	281.0	472.7
Turkey	—	0.6	28.4	28.3	14.5	21.8	9.8	2.2
USSR	4,987.0	7,476.2	7,086.5	6,889.0	7,825.1	7,502.5	—	—
United Kingdom	3,925.9	4,152.2	4,257.2	3,349.7	3,190.0	3,677.4	4,404.2	4,377.0
United States	2,275.1	6,422.8	3,707.8	5,343.5	2,706.7	2,438.8	1,857.0	2,361.1
Yugoslavia	155.2	316.3	728.0	651.9	321.2	471.6	277.6	313.1
Total of available data for countries listed	60,502.3	88,277.1	109,529.9	125,685.6	109,931.9	122,512.3	115,991.8	124,044.7

Source: U.N. "Statistics of World Trade in Steel" 1977, 1978.

**Table 4-3-29 Total Imports of Semi-Finished and Finished Steel Products
by Regions and Countries of Destination**

Destination	1965	1970	1973	1974	1975	1976	1977	1978
	(10 ³ M/T)							
AFRICA -- TOTAL	2,734.1	3,174.7	3,893.1	5,373.6	4,885.1	4,280.8	5,343.9	4,847.1
Algeria	174.5	512.2	811.1	1,116.9	901.3	650.7	1,230.1	1,443.6
Angola	45.6	85.0	90.7	95.7	37.4	0.8	43.9	28.3
Burundi, Rwanda	3.4	10.1	22.4	9.7	3.2	9.2	16.2	15.0
Congo	34.1	19.9	31.8	42.4	23.6	28.4	31.3	12.6
Ethiopia	22.2	59.6	43.8	34.1	22.8	24.0	39.8	16.5
Gabon	—	23.9	57.6	62.5	79.8	82.0	97.7	28.8
Ghana	82.8	47.0	39.2	57.1	67.5	62.0	90.7	45.6
Guinea	3.9	44.9	4.8	5.2	16.2	4.9	11.9	18.2
Ivory Coast	—	90.7	91.7	92.9	87.7	139.6	149.9	170.7
Kenya	132.2	133.7	151.2	166.5	94.9	167.1	175.8	207.8
Liberia	17.8	26.8	39.1	19.8	13.1	20.1	26.6	21.6
Libyan Arab Jamahiriya	148.2	193.0	533.0	615.7	590.9	599.3	406.7	408.8
Madagascar	28.8	49.2	31.1	42.9	29.6	24.9	34.3	34.0
Malawi	1.4	7.1	10.5	9.4	11.4	13.4	18.4	15.6
Morocco	132.5	245.6	297.9	334.7	373.4	542.6	624.1	480.6
Mozambique	70.7	44.9	27.0	33.8	21.2	18.3	14.4	37.5
Nigeria	243.9	469.1	516.0	649.7	1,029.7	937.4	1,329.6	1,024.4
Senegal	—	33.4	43.1	57.9	45.0	57.5	53.8	43.5
Sierra Leone	—	7.3	11.0	11.8	8.2	11.6	9.2	8.2
South Africa	855.2	443.0	566.2	1,097.9	850.5	247.2	145.1	137.3
Southern Rhodesia	30.7	3.1	—	—	4.0	—	0.6	0.0
Sudan	43.0	72.0	93.7	89.3	62.3	68.9	138.4	57.6
Togo	7.2	12.0	8.3	15.1	14.7	17.8	18.5	33.5
Tunisia	118.0	54.7	97.0	111.0	121.2	141.8	221.2	184.5
Uganda	—	22.3	8.1	5.3	4.2	2.5	7.4	2.8
United Rep. of Tanzania	—	62.5	72.7	88.5	55.2	81.0	71.4	99.8
Zaire	38.2	130.9	103.6	151.1	73.9	41.5	60.1	38.8
Zambia	8.9	44.7	93.8	172.0	50.4	32.1	41.6	24.1
Other Africa	490.9	226.1	217.9	184.7	191.8	204.2	235.5	206.3
FAR EAST -- TOTAL	5,173.6	8,631.9	13,245.9	14,249.9	11,540.2	13,751.2	15,880.2	21,277.5
Afghanistan	15.5	9.8	10.1	8.9	16.2	18.7	20.9	14.0
Bangladesh	—	—	144.3	70.8	72.3	81.5	89.0	108.9
Burma	95.4	69.4	24.4	31.1	55.3	40.2	43.4	31.3
China	722.1	2,217.6	3,675.3	3,585.9	3,901.5	4,513.1	4,848.7	8,842.5
Democratic Kampuchea	—	11.2	16.7	2.8	2.6	—	6.1	0.0
Hong Kong	413.9	454.7	499.6	511.2	462.5	808.2	937.8	893.4
India	895.8	717.6	1,163.7	1,306.9	628.5	554.8	574.8	1,077.7
Indonesia	253.9	320.8	811.3	901.9	1,005.6	987.8	964.9	1,039.3
Japan	44.3	95.5	14.2	275.3	61.5	74.7	192.9	189.9
Korea, Dem. Pp. Rep.	44.9	36.6	117.4	178.7	35.4	21.7	13.1	25.0
Korea, Rep. of	174.4	483.5	1,912.9	1,903.5	938.9	1,602.9	2,085.8	2,811.7
Lao Pp. Dem. Rep.	0.3	7.0	15.1	1.1	2.6	0.9	1.6	0.0
Malaysia	248.2	291.9	511.0	624.8	417.1	494.9	487.7	615.6
Pakistan	658.9	542.1	280.4	333.8	402.9	368.2	530.5	450.9
Philippines	530.9	1,037.6	787.7	814.2	564.4	793.1	998.9	1,060.9
Singapore	—	514.7	924.0	1,160.5	1,066.9	872.5	970.4	937.6
Sri Lanka	64.1	39.7	51.4	49.2	51.2	58.7	21.0	97.8
Thailand	353.3	569.6	721.8	673.8	648.0	830.5	1,076.6	992.3
Vietnam	138.2	300.9	161.0	207.0	156.8	214.9	260.5	394.1
Other Far East	519.5	911.7	1,402.6	1,608.5	1,050.0	1,413.9	1,755.6	1,694.6
MIDDLE EAST -- TOTAL	2,121.3	3,119.2	5,134.7	7,511.3	9,631.6	10,211.3	8,468.4	9,862.1
Bahrain	13.2	28.4	39.2	88.5	44.8	85.1	59.0	48.3
Egypt	267.6	370.5	284.0	491.5	844.8	644.5	479.5	459.4
Iran	558.8	973.2	1,991.9	2,262.4	4,086.9	3,750.8	3,265.3	4,564.4
Iraq	169.9	345.3	474.2	1,410.6	1,491.3	804.8	420.3	854.7
Israel	313.4	441.6	608.0	790.5	486.2	426.3	452.4	399.2
Jordan	—	48.1	49.2	53.4	72.0	152.1	76.5	111.1
Kuwait	134.9	113.4	145.1	327.0	272.2	905.0	511.4	338.7
Lebanon	204.6	227.3	419.8	415.5	247.4	68.8	183.4	289.4
Saudi Arabia	244.0	192.4	591.5	732.6	1,026.5	1,502.4	1,617.9	1,906.6
Syrian Arab Republic	71.5	206.7	181.7	422.6	361.2	686.6	479.1	305.6
Other Middle East	143.4	172.3	350.1	516.7	698.3	1,184.9	923.5	584.8

Source: U.N. "Statistics of World Trade in Steel" 1977, 1978.

Destination	1965	1970	1973	1974	1975	1976	1977	1978
	(10 ³ M/T)							
OCEANIA - TOTAL	1,190.4	1,127.0	1,459.7	1,749.6	964.1	2,146.5	1,080.1	925.4
Australia	624.7	479.9	780.2	870.7	338.2	425.1	497.0	401.2
New Zealand	493.8	536.1	575.5	777.0	535.6	1,651.7	508.1	453.2
Other Oceania	71.9	111.0	104.0	101.9	90.3	69.7	74.9	71.0
NORTH AMERICA - TOTAL	11,205.0	13,327.0	14,025.8	16,536.0	11,092.6	12,676.1	18,012.4	17,153.7
Canada	1,697.7	1,476.3	2,098.9	3,198.5	1,572.0	1,332.9	1,438.0	1,715.2
United States	9,307.3	11,847.9	11,924.3	13,330.2	9,513.1	11,326.9	16,557.6	15,428.3
Other North America	-	2.8	2.6	7.3	7.5	16.3	16.9	10.1
OTHER AMERICA - TOTAL	3,144.7	4,334.9	6,544.3	10,064.2	8,180.0	6,082.0	6,544.0	6,574.1
Argentina	981.1	1,195.5	1,698.7	1,523.0	1,789.0	773.5	847.6	554.5
Bolivia	42.3	48.0	23.7	43.5	83.6	40.1	62.2	35.4
Brazil	135.6	508.5	1,826.9	4,018.7	2,289.6	1,140.4	693.4	566.2
Chile	110.2	149.2	71.7	102.7	53.2	17.6	64.0	87.3
Colombia	146.3	329.0	225.2	357.0	195.4	272.3	330.1	366.5
Costa Rica	-	71.1	79.5	100.1	65.4	129.1	115.6	140.3
Cuba	161.2	270.2	380.3	507.8	579.2	531.0	149.5	124.8
Dominican Republic	23.6	63.4	76.2	108.0	105.9	99.2	105.0	86.9
Ecuador	54.3	129.6	102.4	200.4	136.8	168.7	276.3	255.7
El Salvador	-	35.7	44.1	57.2	34.2	40.9	69.7	78.5
Guatemala	71.3	66.3	75.4	89.8	62.0	127.5	133.1	139.2
Haiti	5.5	17.6	27.4	16.6	16.8	27.9	15.4	31.2
Honduras	21.0	30.8	31.6	39.0	23.7	46.7	49.5	51.2
Jamaica	148.8	91.9	92.1	89.2	65.9	46.3	44.0	54.7
Mexico	226.3	241.5	345.5	735.3	709.1	511.9	678.4	1,828.2
Nicaragua	-	32.7	77.5	101.1	29.5	44.0	45.2	39.6
Panama incl. Canal Zone	34.2	55.6	60.6	68.4	39.3	39.7	57.3	88.2
Paraguay	8.6	3.2	2.0	4.8	14.6	10.7	13.5	7.4
Peru	239.6	193.8	212.9	319.7	357.3	139.3	160.9	138.9
Trinidad and Tobago	-	80.9	116.6	85.0	108.4	97.6	149.4	166.0
Uruguay	39.9	13.8	8.9	16.3	34.3	20.6	21.3	15.8
Venezuela	442.2	503.3	766.4	1,273.1	1,208.8	1,518.4	2,204.6	1,563.8
Other	252.7	253.3	198.7	207.5	178.0	238.6	259.0	154.2
WESTERN EUROPE - TOTAL	25,695.9	42,309.2	47,217.6	48,998.9	41,979.7	49,278.6	46,220.5	45,666.5
Austria	246.5	479.0	734.0	706.5	498.4	663.5	729.2	862.4
Belgium-Luxembourg	1,233.7	2,366.2	2,490.7	2,707.6	2,107.2	2,608.9	2,998.0	2,954.4
Denmark	1,154.9	1,432.1	1,631.8	1,565.9	1,220.7	1,469.4	1,215.4	1,254.0
Finland	647.8	850.5	780.9	789.0	660.4	586.2	419.8	403.2
France	3,896.2	7,468.1	8,554.0	8,100.6	6,459.9	8,368.8	7,580.7	8,222.8
Germany, Federal Rep. of	5,686.5	9,106.0	10,195.2	9,003.9	8,633.4	10,473.2	10,120.5	10,655.1
Greece	528.1	964.9	1,101.7	1,137.1	935.8	1,045.0	1,134.7	1,117.6
Iceland	25.2	35.8	39.9	48.7	31.1	37.8	39.0	40.5
Ireland	202.2	226.4	351.7	363.2	226.2	317.6	331.3	387.4
Italy	1,902.6	4,632.2	4,608.6	4,445.4	3,101.8	4,643.1	4,699.0	4,171.1
Netherlands	2,531.2	3,484.0	4,444.8	4,873.7	3,735.6	3,814.7	3,447.8	3,540.2
Norway	860.4	1,179.8	1,299.3	1,685.8	1,367.8	1,341.4	1,235.1	1,131.0
Portugal	329.5	472.4	587.4	912.0	452.1	514.3	794.2	660.9
Spain	2,051.3	1,736.2	1,130.2	1,427.1	2,321.2	1,944.6	1,435.5	772.3
Sweden	1,358.1	1,665.7	2,199.0	2,303.1	2,212.2	2,358.9	1,611.7	1,815.0
Switzerland	1,440.2	2,024.7	2,143.9	1,877.0	1,263.1	1,731.1	1,703.4	1,923.7
Turkey	330.2	315.8	721.7	1,345.8	1,103.3	1,418.5	1,539.7	669.8
United Kingdom	665.1	2,227.5	2,580.8	3,729.0	3,527.5	3,926.4	3,461.4	3,306.8
Yugoslavia	493.4	1,542.2	1,354.7	1,777.8	1,845.5	1,548.8	1,395.4	1,510.0
Other Western Europe	113.0	99.7	267.3	199.7	275.9	466.4	328.8	268.4
EASTERN EUROPE - TOTAL	6,711.3	11,100.1	14,078.8	17,169.8	17,878.6	20,061.8	10,275.3	11,651.5
Albania	13.5	54.4	89.2	96.4	87.9	85.6	114.1	87.9
Bulgaria	603.5	1,011.1	1,127.2	1,068.0	1,930.4	1,042.1	391.2	489.6
Czechoslovakia	1,160.5	588.2	469.0	364.0	442.0	1,031.1	252.9	325.7
German Democratic Rep.	2,065.5	3,117.0	3,180.0	3,344.8	3,524.6	3,585.1	587.7	647.4
Hungary	251.0	850.5	990.4	1,082.2	1,064.1	1,024.1	373.1	339.2
Poland	249.2	1,357.6	2,407.4	3,123.5	3,115.3	2,970.0	1,411.7	1,065.2
Romania	1,131.8	1,451.7	1,321.1	1,374.4	1,415.7	1,824.8	1,066.0	1,050.5
USSR	1,236.3	2,669.6	4,491.5	6,716.5	6,308.6	8,499.0	6,078.5	7,646.1
UNALLOCATED	2,526.0	1,153.1	3,930.0	4,032.3	3,780.0	4,024.0	4,166.8	6,087.0
TOTAL WORLD	60,502.3	88,277.1	109,529.9	125,685.6	109,931.9	122,512.3	115,991.6	124,044.8

Table 4-3-30 Steel Consumption of Arabian Countries

	Population	Steel Consumption		
	'76	'70	'76	
	(thousand)	(10 ³ M/T)		
Iran	33,592	1,240	4,919	
Iraq	11,510	449	1,082	
Saudi Arabia	9,240	230	1,999	
Kuwait	1,030	139	1,174	
Bahrain	320	38	113	
Jordan	2,792	53	195	
Oman	796	172	1,185	
U.A.E.	694			
Qatar	210			
Yemen (PDR)	1,743			
Yemen (AR)	5,406			
Total	67,333	2,321	10,667	158 kg per Capita ('76)
		Annual Growth Rate '70 - '76	28.9%	

Source: Japan Iron & Steel Ass. "Iron & Steel Handbook 1979".
World Bank "ATLAS" 1978.

3-4-7 Cement

1) The canal traffic of cement reached 11,226 thousand tons in 1978, an increase of 86% over the preceding year, which occupied the largest share among southbound dry cargoes. Average annual growth rates were 56% for 1976 - 1978 and 18.7% for 1965 - 1978. Main export countries in 1978 were Spain and Greece supplying 64%, and importing countries were Arabian Gulf nations taking 93%, including Saudi Arabia's 46%. (see Table 4-3-35).

2) Of these importing countries, Saudi Arabia, Iran, UAE, Kuwait and Iraq had a growth of consumption in 1975 - 1978 of as much as 29,532 thousand tons. They doubled their consumption and they increased imports by 2.2 times to 12,692 thousand tons in the same period with an annual growth rate of over 25%.

The level of per capita consumption in U.A.E. and Kuwait was 1,950 kg and 1,450 kg, respectively, 3 times as high as developed nations and that in Saudi Arabia was 929 kg, 50% higher. More populated Iran and Iraq had per capita-consumption of 300 kg 552 kg respectively and there is room for further growth.

The population of 57,951 thousand of these countries in 1978, had a per capita consumption of 510 kg. In view of the active economy in these countries there is a possibility of consumption exceeding 1,000 kg per capita and an annual growth rate of 10% in total consumption is considered attainable.

3) The production of the above 5 countries in this area marked a high growth of 23% per year, reaching 18 million tons in 1975 — 1978. In 1980, their production capacity is expected to reach 30 million tons. Production plans of the countries are 20 million tons in Iran under the 5th 5 year plan, 10 million tons in Saudi Arabia under 2nd 5 year plan and 10 million tons in Iraq in 1980. They are placing one order after another for cement plants and are expected to become cement exporting countries eventually. Therefore, self sufficiency in these areas is expected to be attained rapidly.

4) After the Suez Canal reopened, cements exports from Europe to the Middle East rapidly increased, accounting in 1978 for almost three-quarters of import in the Middle East countries.

Spain, Greece and Rumania, among European supply countries, stepped up their cement exports. Supply from Southeast Asia region decreased drastically, because demand — supply situation of this region was very tight and cement price increased, their export share to the Middle East areas was declined. But if the cement production in Southeast is increasing, and restore advantageous price of the commodity, the share is expected to increase to the level of 50% in the Middle East countries compared with the supply from European countries.

5) As for the future, the following is forecast based on the foregoing analysis.

- a) In the Middle East area, annual growth rate of consumption 10% up to 1985, 7% up to 1990 and 5% thereafter. The import rate of cement (import/consumption) in this area was 46% in 1978, but in view of the improvement of the self-sufficiency rate, it is estimated that the import rate will decrease by 3% per year up to 1985, 2% up to 1990, 1% up to 1995 and 0.5% thereafter. Further, percentage of supply from Europe, 72% in 1978, is estimated to decrease at a rate of 3% each year up to 1985.
- b) The countries supplying cement to Asia are not clearly known. However, most of the supply is believed to be from Asian producer countries. Thus the volume passing through the Canal is small. As self-sufficiency improves and the supply from Asian producer countries increase, the ratio of the volume of Asia-bound cement passing through the Canal is expected to decrease to 7% in 1985, to 5% in 1990 and to 4% thereafter.

6) Future traffic of cement is calculated as follows:

Year	1978	1985	1990	1995	2000
Traffic Middle East	10,028	7,082	4,966	2,881	1,471
Asia	529	318	246	201	164

(10³ M/T)

**Table 4-3-31 Southbound Transit Volume of Cement
by Major Loading and Unloading Countries**

(10³ M/T)

	1976	1977	1978
LOADING COUNTRIES			
Spain	423	1,241	3,900
Greece	1,439	1,973	3,229
Romania	1,436	1,330	1,479
Poland	297	255	800
Italy	n.a.	n.a.	378
Russia	204	296	370
France	n.a.	n.a.	189
Germany (Fed.)	116	131	187
Germany (Dem.)	118	n.a.	114
Netherlands	n.a.	85	110
Others	598	724	1,037
TOTAL	4,631	6,035	11,226
UNLOADING COUNTRIES			
Saudi Arabia	1,325	2,505	5,117
Iran	227	570	981
U.A.E.	573	473	895
Iraq	193	378	—
Kuwait	127	361	865
Jordan	n.a.	199	328
Rep. of Sudan	n.a.	129	236
Sudan	n.a.	n.a.	—
Others	2,186	1,420	1,443
TOTAL	4,631	6,035	11,226

Source: Suez Canal Report

Table 4-3-32 Production, Exports and Transit Volume of
Cement by Major Loading Countries

(10³ M/T)

		1975	1976	1977	1978
Spain	Production	24,404	25,960	29,422	32,064
	Exports	3,575	4,868	7,919	9,762
	Suez traffic		423	1,241	3,900
Greece	Production	7,770	8,592	10,467	11,333
	Exports	2,831	3,337	4,442	4,898
	Suez traffic	199	1,439	1,973	3,229
Romania	Production	11,520	12,500	13,128	14,000
	Exports	2,835	3,000	3,098	3,000
	Suez traffic	374	1,436	1,330	1,479
Poland	Production	18,540	19,808	21,304	21,678
	Exports	282	600	1,000	2,000
	Suez traffic		297	255	800
U.S.S.R.	Production	122,050	123,950	127,000	129,280
	Exports	3,322	3,000	3,438	3,548
	Suez traffic	72	204	296	370
Germany (Fed.)	Production	32,975	33,832	31,871	32,993
	Exports	2,071	2,078	2,217	2,644
	Suez traffic	30	116	131	187
Germany (Dem.)	Production	10,653	11,345	12,103	12,520
	Exports	400	480	600	650
	Suez traffic		118		114
Netherlands	Production	3,706	3,476	3,891	3,918
	Exports	206	203	335	412
	Suez traffic				

Source: CEMBUREAU "World Statistical Review"
Suez Canal Report

Table 4-3-33 Cement Statistics of Middle East and Other Asian Countries (1975-'78)

(10³ M/T)

	1975	1976	1977	1978
Jordan				
Consumption	507	668	919	936
Per capita Kgs.	188	239	321	318
Production	572	533	501	553
Exports	73	—	—	240
Imports	8	135	418	623
Saudi Arabia				
Consumption	3,950	6,400	7,792	9,010
Per capita Kgs.	440	693	770	929
Production	1,250	1,300	1,292	1,510
Exports	—	—	—	—
Imports	2,700	5,100	6,500	7,500
(Suez traffic)	(309)	(1,325)	(2,505)	(5,117)
(Import from Japan)	(592)	(713)	(1,839)	(2,032)
Yemen Rep.				
Consumption	28	30	100	110
Per capita Kgs.	4	4	18	19
Production	—	—	—	—
Exports	—	—	—	—
Imports	28	30	100	110
Kuwait				
Consumption	870	2,000	1,694	1,721
Per capita Kgs.	870	1,900	1,500	1,450
Production	285	352	329	621
Exports	—	—	58	170
Imports	850	2,000	1,665	1,900
(Suez traffic)	(—)	(127)	(361)	(865)
(Import from Japan)	(411)	(1,197)	(730)	(556)
Bahrain				
Consumption	150	160	376	508
Per capita Kgs.	580	615	1,400	1,450
Production	—	92	190	210
Exports	—	—	8	6
Imports	150	160	392	604
Qatar				
Consumption	241	259	443	352
Per capita Kgs.	268	288	4,400	3,500
Production	164	179	176	211
Exports	—	—	—	—
Imports	77	80	267	241

(10³ M/T)

	1975	1976	1977	1978
U.A.E.				
Consumption	877	1,817	1,396	1,401
Per capita Kgs.	4,000	8,000	2,080	1,950
Production	47	305	310	370
Exports	—	129	550	350
Imports	830	1,512	1,636	1,391
(Suez traffic)	(—)	(573)	(473)	(895)
(Import from Japan)	(130)	(810)	(711)	(685)
Sultanate of Oman				
Consumption	200	250	392	420
Per capita Kgs.	260	316	484	500
Production	—	—	—	—
Exports	—	—	—	—
Imports	200	250	392	420
Iraq				
Consumption	2,625	2,900	5,100	6,800
Per capita Kgs.	236	252	428	552
Production	2,700	2,700	4,600	6,500
Exports	100	50	20	20
Imports	27	250	500	300
(Suez traffic)	(—)	(193)	(378)	(—)
(Import from Japan)	(—)	(—)	(184)	(67)
Iran				
Consumption	6,620	6,900	8,800	10,600
Per capita Kgs.	200	203	257	300
Production	5,370	5,600	7,000	9,000
Exports	—	—	—	—
Imports	1,250	1,300	1,800	1,600
(Suez traffic)	(—)	(227)	(570)	(981)
(Import from Japan)	(53)	(15)	(150)	(84)
Sub Total				
Consumption	16,068	21,384	27,012	31,858
Production	10,388	11,061	14,461	18,975
Exports	173	179	636	786
Imports	6,120	10,817	13,670	14,689

(10³ M/T)

	1975	1976	1977	1978
India				
Consumption	16,059	18,623	18,277	20,747
Per capita Kgs.	27	30	29	32
Production	16,205	18,635	19,084	19,561
Exports	366	771	807	66
Imports	—	—	—	1,316
Burma				
Consumption	181	235	207	214
Per capita Kgs.	6	7	7	7
Production	181	229	255	250
Exports	—	—	51	40
Imports	—	4	3	4
Sikkim-Bhutan				
Consumption	20	30	19	20
Per capita Kgs.	17	25	No reliable pop. data	
Production	—	—	—	—
Exports	—	—	—	—
Imports	20	30	19	20
Thailand				
Consumption	3,336	3,874	4,777	5,554
Per capita Kgs.	79	90	108	123
Production	3,990	4,458	5,088	5,180
Exports	710	660	314	20
Imports	—	—	3	394
Singapore				
Consumption	1,235	1,569	1,287	1,274
Per capita Kgs.	549	688	557	544
Production	1,320	1,550	1,415	1,575
Exports	171	105	161	368
Imports	1,390	1,599	1,442	1,661
Malaysia				
Consumption	1,890	1,859	2,016	2,380
Per capita Kgs.	159	150	160	180
Production	1,428	1,586	1,740	2,200
Exports	—	—	14	20
Imports	467	338	284	200
Indonesia				
Consumption	2,681	2,856	3,188	3,821
Per capita Kgs.	21	21	22	26
Production	1,085	1,806	2,678	3,628
Exports	—	—	—	55
Imports	1,596	1,276	510	297

(10³ M/T)

	1975	1976	1977	1978
Japan				
Consumption	63,222	64,522	69,381	79,187
Per capita Kgs.	547	572	608	689
Production	65,191	68,198	75,176	84,353
Exports	3,932	5,593	6,411	8,342
Imports	—	—	—	—
Korea, Democratic People's Rep. of				
Consumption	6,400	6,800	7,600	7,800
Per capita Kgs.	404	418	456	457
Production	7,000	7,500	8,200	8,500
Exports	600	700	600	700
Imports	—	—	—	—
Korea, Rep. of				
Consumption	8,435	9,080	11,177	14,762
Per capita Kgs.	243	250	305	403
Production	10,129	11,873	14,418	15,467
Exports	2,435	3,666	4,035	1,845
Imports	—	—	—	286
Taiwan				
Consumption	6,539	8,091	8,791	10,192
Per capita Kgs.	405	496	523	591
Production	6,795	8,757	10,334	11,461
Exports	235	541	1,561	1,237
Imports	—	—	—	—
China				
Consumption	28,100	30,100	54,450	66,600
Per capita Kgs.	34	35	59	71
Production	29,000	31,000	56,000	68,000
Exports	900	900	1,600	1,600
Imports	—	—	50	200
Hong Kong				
Consumption	1,190	1,597	2,009	2,360
Per capita Kgs.	272	357	445	512
Production	575	765	1,029	1,236
Exports	3	3	2	4
Imports	1,153	1,625	2,102	2,352
Philippines				
Consumption	3,549	3,379	3,290	3,391
Per capita Kgs.	83	77	73	73
Production	4,351	4,229	4,112	4,147
Exports	802	707	822	823
Imports	—	—	—	—

Source: CEMBUREAU "World Statistical Review"
Suez Canal Report

3-4-8 Other Goods

(1) Significance of Other Goods in the Suez Canal

- 1) "Other goods" are the most important cargo to the Suez Canal, i.e., they account for 60% of the total dry cargoes (southbound 53%, northbound 73%) in 1978. (See subdivision (3)–5))
- 2) In the total of laden and in ballast, liners carrying mainly "other goods" (general cargo ship, containership, LASH and Ro/Ro ships) in 1978 accounted for 69% of the number of ships using the Canal for 48% in terms of Suez net ton (N/T) (southbound 70% and 54% and northbound 68% and 43% respectively). These figures show how important "other goods" are to the Canal.
- 3) Except in a special case such as the east-bound round-the-world route via the Suez Canal, liners normally make a round trip voyage or shuttle service. Once a Suez Canal route is established for liners, it can be assumed that when there is growth of cargo traffic either southbound or northbound even if when one direction is not fully laden, the transit of ships through the Suez Canal will increase.
- 4) In this sense, southbound "other goods" which have shown a remarkable increase recently (average annual growth rate 37.9% in 1976 – '78) are very encouraging.
- 5) One of the main importing areas of the southbound "other goods" is the Middle East countries which have employed a large amount of foreign labor with the background of huge oil revenues and with high possibility of further development of agriculture and industry. The share of southbound other goods to this area was 53.4 – 56.7% in 1976 – '78 and the average annual growth rate was 35.5% in the same period.
- 6) The share of southbound "other goods" to the Asian area (including Japan and also Oceania, in this case) was 41.0 – 46.3% (same period) and the average annual growth rate of 41% exceeded that of the Middle East area. Asia includes some Newly Industrializing Countries which are recently achieving remarkable development, other developing nations which are making much progress, Japan and Australia which are achieving steady economic development compared with other developed countries and China which is promoting modernization under a 10 year plan.
- 7) "Other goods" consist of daily sundries which are supported by personal consumption and are little affected even when the economy stagnates.
For example, although northbound dry cargoes (average annual decrease of 1.11% in 1976 – '78), the northbound "other goods" showed an average annual growth of 4.8%.
- 8) As against these positive aspects of "other goods", it is necessary to examine the negative aspects also. The Middle East is the most promising import region of southbound "other goods". We must take into account the shares of two regions which supply "other goods" to the Middle East. One is the exporting region north of Suez, namely, North America, Europe including the Mediterranean, and the centrally planned economy nations of East Europe. The other is the Asian region, including Japan. The former's share in value was 60.9–65.4% (1970–1977), according to our study, while that of the latter was Japan 14.5% (1977) and other Asian countries

almost 15%. The latter's share, i.e. the Asian share, which does not pass through the Canal, is increasing gradually.

- 9) There are also other competitive routes with regard to "other goods" to the Middle East. One is the Siberian Land Bridge (SLB) between the Far East and Europe or the Middle East. This includes railway routes to Iran and Afghanistan. Another is land transportation by trucks to the Middle East.

It is well known that these competitive routes were actively employed in the past when there was port congestion in the Middle East countries.

- 10) Lastly, seaborne traffic to the Middle East area is likely to approach a second time peak with the remarkable growth of "other goods" trade as mentioned above. In this connection, another problem may arise: the Suez Canal may become congested. Should the Suez Canal become congested, large tankers and bulk carriers would first of all avoid the Suez Canal (Cape route will be cheaper from the cost standpoint). Therefore, it is desirable that full countermeasures be taken against the foregoing possibilities.

(2) "Other Goods" on Global Base

- 1) "Other goods" here include those dry cargoes excluding iron ore, coal, cereals (grain), fertilizers, fabricated metals and cement (from 3-4-2 to 3-4-7 above). However, it is difficult to obtain the figures on this kind of other goods (global). Therefore, as shown in Table 4-3-34, the 5 major bulk cargoes (iron ore, grain, coal, bauxite/Alumina and Phosphate) were subtracted from all dry cargoes and the balance was treated as "other goods" (global) and compared with other goods transiting the Suez Canal.

Table 4-3-34 Other Goods Movements 1965 - '78

(10⁶ M/T)

Region	Year	Dry Cargo		Five Major Dry Bulk Cargoes (B)	Other Goods (A - B)
		Loaded	Unloaded (A)		
World	1950	325	333	—	—
	1965	852	863	356	507
	1970	1,165	1,127	504	623
	71	1,173	1,144	505	391
	72	1,247	1,223	524	699
	73	1,403	1,376	622	754
	74	1,476	1,477	668	809
	75	1,438	1,396	635	761
	76	1,588	1,469	646	823
	77	1,585	1,531	645	886
	78	1,621	1,560	667	893

Source: Dry Cargo; UN Statistical Yearbook and Monthly Bulletin of Statistics, Dry Bulk Cargo, Fearnley & Egers Chartering Co., Ltd., "World Bulk Trades."

- 2) The figure obtained by this method show that global base dry cargoes were 1,621 million tons in 1978, with an annual average growth rate of 5.9% in '50 - '78, 5.1% in '65 - '78 and 4.5% in '70 - '78. In '73 - '78 after the oil shock the annual average growth rate dropped to 2.9%.
- 3) The five major bulk cargoes (global) totalled 667 million tons in 1978 with an annual average growth of 4.9% in '65 - '78, 3.6% in '70 - '78 and 1.4% in '73 - '78, showing a sharp decrease after the oil shock.
- 4) "Other goods" (global) likewise totalled 893 million tons in 1978 with an annual average growth rate of 4.5% in '65 - '78, 2.8% in '70 - '78 and 3.4% in '73 - '78, showing a higher growth rate than major bulk cargoes after 1973.

(3) "Other Goods" through the Suez Canal

- 1) Actual transit dry cargoes by types are taken from Suez Canal Yearly Report and given as follows: "Other goods" are treated as two kinds, i.e., "other goods A" is one kind including cement and fabricated metal and "other goods B" is another kind not including them. The figure of "other goods B" are what we need for our purpose. However, the volumes of "other goods B" in '76 - '78 are somewhat different from those shown in Table 4-3-35 giving Origin/Destination (O/D) of other goods (Suez), which will be used for forecast of Canal traffic. Differences of figures have accrued due to handling of statistical data, but are not an obstacle in analyzing trends.

In these cases Metal Ore is included in Iron Ore and Fertilizer is treated as Phosphate. And the Canal Report does not refer to Bauxite/Alumina.

(dry cargo total)

			(10 ³ M/T)
	Total	Southbound	Northbound
1965	62,448	34,093	28,355
76	83,825	41,664	42,165
77	93,748	51,996	41,752
78	116,600	75,366	41,234

(bulk cargo total)

			(10 ³ M/T)
	Total	Southbound	Northbound
1965	24,664	13,513	11,151
76	20,575	12,190	8,385
77	19,667	12,057	7,610
78	24,157	16,099	8,058

(Other goods A – including Cement, Fabricated metal)

		(10 ³ M/T)	
	Total	Southbound	Northbound
1965	37,784	20,580	17,204
76	63,254	29,474	33,780
77	74,081	39,939	34,142
78	92,443	59,267	33,176

(Other goods B – except cement and Fab. Metal)

		(10 ³ M/T)	
	Total	Southbound	Northbound
1965	31,143	14,638	16,505
76	48,522	21,099	27,423
77	58,752	30,011	28,741
78	70,269	40,147	30,122

note: Metal ore is included in iron ore, while fertilizer is treated as phosphate.
The Canal Report does not refer to bauxite/alumina.

- 2) The foregoing tables show that the actual record of dry cargo (Suez) in 1978 was less than 10% of the world dry cargo total, or 116.6 million M/T (7.5% of world total) of which southbound was 75.37 million M/T (4.8%) and northbound 41.23 million M/T (2.6%). Annual average growth rate of both was 4.9% in '65 – '78 and 17.9% in '76 – '78 (3.1% for the world), of southbound 6.3% in '65 – '78 and 34.5% in '76 – '78, in northbound was a 2.9% increase in '65 – '78 but a 1.1% decrease in '76 – '78. The remarkable growth of the total dry cargoes (Suez) of both directions in '76 – '78 of 17.9% was brought about by the high growth of southbound "other goods" as shown below.
- 3) The actual dry bulk cargoes (Suez) in 1978 totaled of 24.16 million M/T (southbound 16.1 million M/T, northbound 8.06 million M/T, which together made up 20.7% of the total dry cargoes (Suez) and 3.6% of global dry cargoes). Annual average growth rate was – 1.6% in '65 – '78 (4.9% increase in global traffic) and 8.4% in '76 – '78 (1.6% increase in global traffic) which far exceeds the growth of the global rate. By direction, the growths were southbound 1.4% in '65 – '78 and 14.9% in '76 – '78, and northbound –2.5% in '65 – '78 and –1.9% in '76 – '78.
- 4) Next, the actual record of "other goods A" as shown in the foregoing tables (including cement and fabricated metals) in 1978 was 92.4 million M/T (10.4% of the global other goods), with an annual average growth rate of 7.1% in '65 – '78 and 20.9% in '76 – '78 (growth rates of global other goods were 4.5% and 4.2% respectively).
- 5) "Other goods B" as shown in the same tables (except cement and fabricated metals) was 70.27 million M/T in 1978 (7.9% of global other goods. The difference of 2.5%

between this and the rate of 10.4% of above "other good A" represents the rate of cement and fabricated metals which transited the Suez Canal). "Other goods B" accounts for 60.2% of the total dry cargoes (Suez). This shows importance to the Suez Canal. The annual average growth rates were 6.5% in '65 - '78 and 20.3% in '76 - '78, showing a high growth particularly in the latter period. By direction, southbound growth was 8.1% in '65 - '78 and 37.9% in '76 - '78 and northbound 4.7% in '65 - '78 and 4.8% in '76 - '78. While northbound "other goods" show a steady growth of about 4% keeping pace with the GDP of Europe and U.S., southbound show a long term growth of about 8% and a very high growth of 37.9% in the recent '76 - '78. This is, as explained below, due to the rapid growth of southbound "other goods" for Asian countries east of the Suez Canal, especially the Middle East area.

(4) "Other Goods" by Direction and Area (Suez)

- 1) Table 4-3-35, prepared from Suez Canal Monthly Report, shows the "other goods" traffic by direction and by area in 1976 - 1978.

Some differences of the figures from "Other Goods B", in the subdivision (3) - 1) are due to handling of statistical data.

- 2) Southbound other goods are arranged by importing area as follows in accordance with the Table:

Importing Area	Southbound "Other Goods"			A.G. Rate
	1976	1977	1978	
Middle East	12,851 (56.7%)	16,916 (53.4%)	23,604 (56.2%)	35.5%
Red Sea ports	4,902	6,720	10,843	41.7
East Africa & Aden	1,767	2,153	2,436	16.4
Arabian Gulf ports	6,182	8,043	10,325	29.2
Far East (Asia)	4,312 (19.0)	5,343 (16.9)	7,221 (17.2)	29.4
Others (Other Asia & Oceania)	5,491 (24.3)	9,422 (29.7)	11,175 (26.6)	42.7
India, Pakistan, etc.	2,341	3,586	4,262	34.9
S.E. Asia & Sunda	2,228	4,777	5,574	58.2
Australia	413	967	1,339	80.1
Others	509	92	0 (0.0)	0.0
Total	22,654 (100)	31,681 (100)	42,000 (100)	36.2

3) Northbound "other goods" are arranged by area as follows:

Importing Area	Northbound "Other Goods"						A.G. Rate
	1976		1977		1978		
America & Europe	23,196	(83.6%)	29,221	(84.8%)	26,423	(85.3%)	6.7%
American ports	1,504	(5.3)	1,805	(5.2)	1,521	(4.9)	0.6
N.W. Europe & UK	13,570	21,692 (77.6)	15,346	27,416 (79.6)	14,817	24,902 (80.4)	4.5
Baltic Sea	1,041		1,253		879		Δ8.1
N. Mediterranean	4,610		6,675		6,581		19.5
E. & S.E. "	1,945	930	3,212	462	2,163	Δ6.3	5.5
W. & S.W. "	526		789		870		(2.8)
Black Sea ports	3,769	(13.5)	4,446	(12.9)	3,684	(11.9)	Δ1.1
Others	991	(3.5)	789	(2.3)	870	(2.8)	Δ6.3
Total	27,956	(100)	34,456	(100)	30,977	(100)	5.3

4) Of southbound "other goods", the Middle East share was the highest at 53.4% – 56.7% in 1976 – '78. "Other Asia" includes Oceania and Far East, has the largest annual average growth rate of 42.7%, Australia shows the highest growth rate of 80.1%, but the share is not so large. Australia is followed by 58.2% of S.E. Asia and Sunda Islands, 34.9% of India, Pakistan, Sri Lanka and Burma, and 29.4% of the Far East, including Japan, China and Korea. The Middle East area, on the other hand, shows a high growth rate of 35.5%.

5) However, future economic growth of the Far East, Other Asia and Oceania can not be expected to be as great as that of the Middle East.

Japan and Australia, among other developed countries have marked a relatively steady growth since 1973, and they are expected to continue a growth of about 4% through the 1980s (see OECD Outlook).

China, also, is expected to achieve a substantial growth (about 6 – 7%) by promoting her modernization program although there remain some restricting factors such as balance of payments. The growth of NICs in Asia, such as Korea, Singapore and Hong Kong, is remarkable and is followed by the active growth of such developing Asian nations as India, Pakistan and Sri Lanka. In Asia as a whole a growth of 5 – 6% can be expected.

However, many Asian countries, except some with resources (eg. Indonesia) specialize in the processing trade by importing raw materials. When future oil price rises are considered, they are not expected to achieve a very high growth. Therefore, the growth rate of "other goods" in the future would be approximately the same as that of GDP or less, depending on circumstances. Mention should also be made that Asia and Oceania, including the Far East, highly depend on intra-territorial trade in the Pacific region. This trade does not transit the Canal (dividing point is roughly Singapore in terms of distance from the US Gulf).

- 6) On the other hand, economy in the Middle East is brisk in both the oil producing nations with huge amount of oil money and even in the non-oil producing nations which receive financial support from the former and others. They have a high potential for industrial and agricultural development despite their small population, and their development plans are being pushed with labor and engineers from foreign countries. The peak volume of seaborne trade of "other goods" will continue to rise higher. (With the progress of industrialization, a portion of "other goods" may be replaced by raw materials.)

In the Middle East, it is noted that the seaborne trade of "other goods", the share of Red Sea area reached nearly 10 million M/T, nearly equal to that of the Arabian Gulf.

- 7) As for northbound "other goods" the only notable growth is the 19.5% (annual average growth rate) of the north Mediterranean ports. Baltic Sea ports and West and South-West Mediterranean ports show minus growths. American ports are inactive and North-West Europe and UK ports show a steady growth of 4.5% in the light of their economic situation. And, in total of America & Europe Area, the growth rate shows 6.7%.

The annual average growth rate of Black Sea ports, representing imports by the centrally planned economies of Eastern Europe is a minus 1.1%. The economy of this area is hurt by poor crops due to inclement weather and because of slow industrialization appreciable improvement in the growth rate of "other goods" cannot be expected.

(5) Economic Forecast of Future (up to year 2,000)

According to world economic forecast up to 2,000, the "OECD Interfutures" gives the future economic growths of "other goods" by importing area as follows:

OECD Interfutures GDP 1975 - 2000				
Scenario	A	B2	C	(%) D(3)
(a) Southbound				
N. Africa & W. Asia (Middle East)	7.0	6.0	5.4	6.0
Asia & Oceania (incl. Japan & China)	6.2	5.7	4.2	5.5
(b) Northbound				
USA & Europe	3.3	2.5	3.2	4.2
Eastern Europe (Black Sea)	5.0	4.8	4.2	4.8

(6) Future Growth Rates (1980 - 2000) of "Other Goods" (Suez)

- 1) On the basis of the foregoing analyses, and taking the figures of 1978 as the base, the future growth rates of "other goods" (Suez) up to 2,000 are set as follows:

Importing Area	Southbound "Other Goods" (10 ³ M/T)			
	— '85	— '90	— '95	— 2000
Middle East	8%	7%	5%	5%
Asia (Far East)	6	6	5	5
Others (Other Asia & Oceania)	5	5	4	4

Importing Area	Northbound "Other Goods"			
	— '85	— '90	— '95	— 2000
America & Europe	2.5%	2.5%	2.5%	2.5%
Black Sea	4	4	4	4
Others	3	3	3	3

2) The above growth rates in "other goods", it must be mentioned that traffic to the Middle East, may be on the low side compared with those of many other studies.

(7) Estimated Volume of "Other Goods" (Suez)

The forecast of future traffic of "other goods" (Suez) is given as follows:

Importing Area	Southbound "Other Goods" (10 ³ M/T)			
	'85	'90	'95	2000
Middle East	40,454	56,739	72,414	92,420
Asia (Far East)	10,857	14,529	18,544	23,667
Others (Other Asia & Oceania)	15,724	20,069	24,417	29,707
Total	67,035	91,337	115,375	145,794

Importing Area	Northbound "Other Goods" (10 ³ M/T)			
	'85	'90	'95	2000
America & Europe	4,919	5,984	7,281	8,858
Black Sea	31,409	35,536	40,206	45,489
Others	1,075	1,247	1,445	1,676
Total	37,403	42,767	48,932	56,023

Table 4-3-35 Cargo Movements by Areas of "Other Good" in the Suez Canal 1976 - 1978

(a) Southbound goods tonnage by loading and unloading areas

(10³ M/T)

Regions	Other Goods		
	1976	1977	1978
A. Loading areas:			
North & West Europe & U.K. Ports	9,142	13,899	19,467
Baltic Sea ports	785	1,053	1,370
North Mediterranean ports	4,814	7,140	9,481
East & S.E. Medit. ports	794	689	972
West & S.W. Medit. ports	652	1,081	1,648
Black Sea ports	2,941	3,603	4,002
American ports	3,244	3,888	4,643
Others	282	328	417
TOTAL	22,654	31,681	42,000
B. Unloading areas:			
Red Sea ports	4,902	6,720	10,843
East Africa & Aden	1,767	2,153	2,436
India, Pakistan, Sri Lanka & Burma	2,341	3,586	4,262
Arabian Gulf ports	6,182	8,043	10,325
South East Asia & Sunda Islands	2,228	4,777	5,574
Far East	4,312	5,343	7,221
Australia	413	967	1,339
Others	509	92	0
TOTAL	22,654	31,681	42,000

(b) Northbound goods tonnage by loading and unloading areas

(10³ M/T)

Regions	Other Goods		
	1976	1977	1978
A. Unloading areas:			
North & West Europe & U.K. ports	13,570	15,346	14,817
Baltic Sea ports	1,041	1,253	879
North Mediterranean ports	4,610	6,675	6,581
East & S.E. Medit. ports	1,945	3,212	2,163
West & S.W. Medit. ports	526	930	462
Black Sea ports	3,769	4,446	3,684
American ports	1,504	1,805	1,521
Others	991	789	870
TOTAL	27,956	34,456	30,977
B. Loading areas:			
Red Sea ports	2,311	2,419	2,637
East Africa & Aden	2,175	2,848	3,574
India, Pakistan, Sri Lanka & Burma	5,720	5,675	4,852
Arabian Gulf ports	478	354	291
South East Asia & Sunda Islands	8,880	10,299	11,311
Far East	5,124	10,056	6,178
Australia	2,675	2,715	2,134
Others	593	90	0
TOTAL	27,956	34,456	30,977

Source: Suez Canal Report.

3.5 Concluding Remarks

1) Regarding prospects of Suez Canal cargo traffic, the most promising are southbound with respect to destination and "other goods" with respect to cargo type. Expectations can be placed to a certain extent also on fertilizer, steel and grain. The Middle East has the highest certainty with regards to "other goods".

There are, however, some items such as cement and nitrogen fertilizers whose traffic is expected to decrease because the current importing countries are rapidly building up their self-sufficiency.

2) With respect to the northbound cargoes of the Canal, iron ore, cereals, fabricated metal and coal are expected to increase to some extent, but cargo movement of oil will show a decreasing trend due to saving of oil in the USA and Europe. Generally speaking, too much growth of northbound cargo except coal can not be expected in view of the slow economic growth of the USA and Europe to which a considerable proportion of northbound cargo is directed.

After the completion of the First Stage Development Project of the Suez Canal, the potential of northbound traffic of large tankers and bulk carriers transporting oil, iron ore and coal (including energy coal), a large proportion of which at present is carried via Cape, is expected to become higher as to iron ore and coal, but the oil situation is far from reassuring.

4. Demand & Supply Balance of Ships Tonnages and Market, Maritime Transportation Cost

4-1 General

- 1) In this chapter, the past and present situation of demand and supply balance of ships' tonnage and the future trend of shipping market are viewed. In addition, the influence of the market on the transit volume of ships through the Canal, especially large sized ships shall be analysed in order to determine the theory needed to forecast the volume of transit tonnage. Further, on the basis of the cost analysis of maritime transportation, material is provided for the calculating the benefits which might result from the 2nd Stage Development Project of the Canal.
- 2) With respect to the calculation of ships tonnage, the transportation share by type of ship and by cargo, the increased transportation ratio of containership, and a certain rate of increase in ship size are taken into account.

4-2 Demand & Supply Balance of Ship Tonnages

4-2-1 Tanker

The tanker market reached its peak in 1973, and the contracts for tanker building suddenly increased in 1972 and 1973 with an upward trend of the market. In autumn 1973, however, with the announcement of the oil embargo policy by oil producing countries and the drastic increase in oil prices, the tanker spot market quickly worsened. The market was depressed to 61 points in 1974 against 100 points for 1973, and further depressed to the 30s in 1975 through 1978. During this period the tanker requirements, after dipping in 1975, recovered somewhat in 1976 and 1977, but decreased again in 1978. While the peak value since 1973 of the tanker requirements was 112 in 1977, the tanker supply index stood as high as 161 in 1977 against 100 for 1973 because of the completion of new tankers ordered in 1972 and 1973. The supply of tankers continued to increase until 1978, and it began to decrease at last in 1979. And since the tanker requirements somewhat increased in 1979, the demand-supply gap improved slightly. The demand-supply gap, taking only the total of the laid-up and the slow steaming, tonnage was as high as 71.5 million DWT in 1975, 82.3 million DWT in 1976, 90 million DWT in 1977 and 108.3 million DWT in 1978, because surplus tonnage had been absorbed through lay-up, slow steaming, part-cargo incidence, excess port time, etc. In 1979, however, it presumably decreased to 33.1 million DWT, which is still large though it shows some adjustment. The supply-demand gap of tanker tonnage will conceivably continue to decrease in future, too, as demand for tonnage will possibly decrease. Because of successive oil price increases, carried out by oil producing countries and uncertainty over oil supply, the major oil importing countries have adopted their restrictive policies to save on oil consumption. And, at the end of 1979, the IEA member countries fixed their ceiling of oil import at 1,205.3 million tons for 1980 and 1,289.6 million tons for 1985 respectively. According to the BP Statistical Review, the total oil import of USA, Canada, Western Europe, Japan and Australia as of 1978 stood at 1,370 million tons. It is presumably inconceivable that the oil imports will increase at a similar pace as before. In fact, according to the same review, the growth rate of world oil consumption, declined partly because

of delayed economic recovery and partly because of greater oil saving specifically in Western Europe and Japan. Meanwhile the slash in oil consumption in North America, especially USA, is not progressing as much as in other advanced countries. However, President Carter's New Energy Policy announced in July 1979 was ambitious, and according to this policy, an oil import slash of 8.5 million B/D (approximately 425 million tons annually) will be made in the 1980s while the import in 1990 will be 4.5 million B/D (approx. 225 million tons). Import in 1978 stood at 409.2 million tons.

Average oil transportation distance for USA was a little more than 7,300 miles in 1978, while the world average distance was a little more than 6700 miles. This means the US is dependent on longer distance importing sources. If a trial calculation is made for the case in which US's oil import in 1990 will be 225 million tons, of which as much as 90 million tons will be imported from Mexico. The transportation distance from Mexico to US is only 750 miles, 56 voyages will be possible per year and the transportation service will be made by smaller tankers. The needed tonnage of smaller tankers for 90 million tons of oil from Mexico to US will be enough nearly 1.7 million DWT. One more major factor which decreases the ton-mile base oil movement is the North Sea Crude oil production.

The outputs in 1978 of this area were 17.5 million tons of Norway and 55 million tons of UK, totaling 72.5 million tons. Norway already can afford to export, while UK's oil self-sufficiency rate is as high as 85%. UK's self-sufficiency rate will be close to 100% in 1979, and she will have export potentiality after that. UK's net amount of oil import in 1978 was 23.6 million tons. If such an amount is replaced with North Sea crude oil, the demand for ships tonnage will decrease to an estimated 0.5 million DWT from 3.94 million DWT. Further, it is conceivable that there will be a shift from larger to smaller ships because of the short-distance of transportation.

It follows from the above that the existing big gap between demand and supply of tanker tonnage will remain only in the large-sized tanker sector, i.e. VLCC and ULCC. The following tables are helpful for getting a picture of the tonnage situation in the near future.

**Table 4-4-2 Tanker Tonnage Ordered by Delivery Time
(as of end of June 1979)**

			(10 ⁶ DWT)
	Tanker	Half tonnage of combined carrier	Total
1979	4.44	0.31	4.75
1980	5.75	0.33	6.08
1981	2.84	0.10	2.94
1982/3	0.71	—	0.71

And, according to Fearnley & Egers statistics, the tanker tonnage in the near future will presumably increase slightly as follows:

Table 4-4-3 Estimated Tanker Fleet

	(10 ⁶ DWT)		
	Tanker	Half tonnage of combined carrier	Total
End of 1979	326.1	24.1	350.2
" 1980	328.9	24.2	353.1
" 1981	331.8	24.2	356.0
" 1982	338.7	24.1	357.8

The pressure of supply side of shipping has weakened, but dissolution of the demand and supply gap will not be attained for some years ahead. The tanker market reports issued by various investigating organs express the same view, and supply-demand equilibrium will not be attained until after 1985.

Table 4-4-1 Tanker Business Data

	1973	1974	1975	1976	1977	1978	1979	* Mid-year
J. I. Jacobs								
(1) Existing Tanker Fleet (excl. comb.)	199.2 (100)	231.9 (116.4)	272.6 (136.9)	305.9 (153.6)	324.2 (162.8)	326.7 (164.0)	318.8 (160.0)	
(2) Existing Tanker Fleet (incl. ½ comb.)	215.4 (100)	251.6 (116.8)	294.0 (136.5)	328.3 (152.4)	347.6 (161.4)	350.4 (162.7)	342.7 (159.1)	
(3) Tanker Requirement (Ton-Mile)	10,216 (100)	10,620 (104)	9,727 (95)	11,179 (109)	11,459 (112)	10,678 (105)	10,945 (107)	* Figure in '79 is estimate Unit 109 ton-mile
(4) Gap of Demand and Supply	0	12.8	41.5	43.4	49.4	57.7	52.1	* (2) - (3)
(5) Tanker Surplus								
1) Laid-up Tanker (incl. ½ c.c.) (incl. ½ c.c.)	0.5 (0.2%)	0.2 (0.1%)	40.0 (13.6%)	48.5 (14.8%)	34.0 (9.8%)	40.3 (11.5%)	17.0 (5.0%)	* Mid-year. Figures in '73, '74 are average % of (2)
2) Slow steaming (incl. ½ c.c.)	-	2.0 (0.8%)	31.5 (10.7%)	33.8 (10.3%)	56.0 (16.1%)	68.0 (19.4%)	16.1 (4.7%)	* Average. Figures in '74, '79 are Mid-year
3) VLCCs laid-by	-	-	-	-	n.a.	n.a.	6.4	* Figures '74 - '76 are not available in J.I. Jacobs, and Figures in (5) - (2) '74-'76 are by F & E.
4) Excess Port Time	-	-	-	-	16.0	22.5	20.4	Figures in (5) - (1) '73 - '74 are by F & E.
5) Part Cargo incidence	-	-	N.A.	-	n.a.	5.0	20.0	
6) Slow steaming by large c.c.	-	-	-	-	n.a.	n.a.	1.7	
7) Overall surplus	1.7	-	-	-	137.5	142.0	108.9	* Mid-year
(6) Market								
Mullion	231.4 (100)	141.5 (61.2)	75.4 (32.6)	84.9 (36.7)	74.3 (32.1)	80.8 (34.9)	145.5 (62.9)	
Norwegian S.N.								
1) 150,000 DWT & above		59.6	21.7	28.8	24.7	29.1	47.5	
2) 60 - 150,000 DWT		86.1	42.9	50.3	47.4	64.1	117.8	
3) 30 - 60,000 DWT	N.A.	132.5	70.0	81.7	84.9	107.9	216.7	
4) Under 30,000 DWT Dirty		177.1	101.0	108.7	121.5	152.2	324.3	
5) Under 30,000 DWT Clean		208.8	106.4	117.0	127.7	162.4	337.5	

Sources: J. I. Jacobs, F & E, Mullion Index, Norwegian Shipping News Index.

Table 4-4-4 Growth of World Bulk Fleet

(10³ DWT)

Type of Vessel	1971	1972	1973	1974	1975	1976	1977	1978
Combined Carrier (Half existed tonnage)	10,143	14,331	18,357	20,561	21,518	23,345	23,993	24,260
Ore Carrier	9,802	10,979	11,849	11,435	11,495	12,296	12,183	12,085
Other Bulk Carrier	58,131	66,605	75,535	84,515	91,286	101,412	114,513	122,426
Sub-total	67,933	77,584	87,384	95,950	102,781	113,708	126,696	134,511
Total	78,076	91,915	105,741	116,511	124,299	137,053	150,689	158,771
Rate of increase (%)	—	(17.7)	(15.0)	(10.2)	(6.7)	(10.3)	(9.9)	(5.4)

Source: H.P. Drewry, "World Shipping Statistics 1979."

4-2-2 Dry Bulk Carrier

The world seaborne trade of main dry bulk cargoes steadily increased from 1970 through 1976. Its average annual increase during the period was 4.2%. In 1977, due to the delayed economic recovery, it was one million tons less than in the previous year. However, in 1978, it recovered slightly, increasing by 1.4%, or 2% in terms of ton-miles. This means that the world bulk cargo trade can not expect the high growth rate developed in the past. (Refer to table 4-3-1, on the trend of dry bulk seaborne trade).

Meanwhile, the bulk carrier tonnage (including a half of combined carriers) increased by more than 10% annually from 1971 to 1975. And until 1977, the supply pressure of ship tonnage did not decrease because new bulk carriers had begun to be completed, including substitutes for tankers which had been already ordered but cancelled during the period of depressed tanker market. But in 1978, the effect of decreased orders began to appear and the rate of increase of bulk carrier tonnage stood at 5.4%.

Nevertheless, because of no substantial growth in dry bulk sea transportation demand, as much as 20 million DWT of surplus ship tonnage developed in 1978. 8 million DWT of this surplus were presumably laid up, 9 million DWT were on slow-steaming, and 3 million DWT were absorbed by port congestion. Here, however, ineffective navigation of part cargo or voyage in ballast is not taken into account.

Due to such circumstances, the scrapping of bulk carriers increased to 2.5 million DWT, which is equivalent to 1/3 of the new building for the one year of 1978.

In order to see the changes in circumstances in greater detail, we would like to study the demand-supply index.

Looking at table 4-4-5, we see that the gap between the two indices has tended since 1975 to become bigger year by year. This shows nothing but an absolute excess of ship tonnage. However, the gap was smaller in 1978 than in 1976, showing a possible start of a trend towards improvement.

Table 4-4-5 Demand and Supply Balance Index of Dry Bulk Tonnage

(1973 = 100)

	Index of Bulk Carrier Tonnage	Index of Major Dry Bulk Cargo (Ton-mile base)	Difference
1971	74	80	Δ6
1972	87	82	5
1973	100	100	—
1974	110	108	2
1975	118	107	11
1976	130	107	23
1977	143	107	36
1978	150	110	40

Ship's tonnage by year of delivery according to Fearnley & Egers data is shown in Table 4-4-6.

This shows that in case the dry cargo market is sluggish with weak incentive for ordering, the supply pressure would quickly decrease further.

From this, the presumed ship tonnage in the near future will be as shown in Table 4-4-7.

Table 4-4-6 Total Orderbook of Bulk Carrier, Year of Delivery.

(10⁶ DWT)

	Bulk Carrier	half tonnage of combined carrier	Total
1980	5.4	0.55	5.95
1981	4.7	0.45	5.15
1982	1.8	0.1	1.9

Table 4-4-7 Estimated Dry Bulk Fleet

(10⁶ DWT)

	Bulk Carrier	half tonnage of combined carrier	Total
end of 1979	137.7	24.1	161.8
" 1980	141.1	24.2	165.3
" 1981	144.3	24.2	168.5
" 1982	148.1	24.1	172.2

The above-presumed future ships' tonnage shows that future tonnage increase will be slight. Therefore, if the economic condition improves and the volume of seaborne trade increases, the demand-supply will be quickly balanced. However, even at present, in the case of such type of ships as small bulk carriers, demand-supply is already balanced and the freight rate in this category tends to go up. On the other hand, in case of large bulk carriers, there exists a substantial demand-supply gap, and the recovery of balance in this category is expected to be delayed for several years.

Nevertheless, according to the long-term outlook up till 2000, ship tonnage will conceivably meet the demand. And fundamentally, the demand for ship tonnage, or in other words, the extent of increase in maritime trade accompanying economic growth will factor affecting the future of this carrier is coal. Above all, energy coal which is a substitute for oil energy will be the biggest factor. Especially if the rate of economic growth is high, the conversion to coal will be accelerated considerably and bring about a shortage in ship tonnage. On the other hand, with respect to the building capacity, when the total tonnage on order reaches around three times of the ship building capacity (i.e., total order backlog of three years), a vigorous investment will probably follow and the bottle-neck in supply capacity would be dissolved within a comparatively short period even if a temporary bottle-neck should arise.

4.3 Maritime Transportation Cost and Canal Traffic

4.3-1 Route Selection in case of Large Sized Vessels

(1) Tanker

Past records clearly show that the passage through the Canal by large tankers would change largely according to the tanker market. And according to European tanker companies (including companies affiliated to "Majors"), their criterion for determining passage through the Suez Canal or via the Cape of Good Hope is expressed by the following formula:

$$\text{Daily net income} = \frac{\text{Cargo tonnage} \times \text{Freight rate} - (\text{Fuel cost} + \text{Port charges} + \text{Canal dues})}{\text{No. of days needed for a voyage}}$$

Tanker companies will in general choose the trade or route which produces a higher daily net income.

Although this choice will be influenced in the short-term by various factors such as rate for long-term contract, demand-supply of total ship tonnages under control and trend in oil prices, etc.. This formula will be applied in the long-range. As to the comparative profitability between via-Suez and via-Cape routes, the higher the freight rate level the more advantageous via-Suez is. In our forecast we establish such dividing points as follows:

Arabian Gulf/Mediterranean Sea	\$4.40 (W29, W22)
" /N.W. Europe	\$6.40 (W39, W31)
" /Caribbean Sea	\$12.30 (W80, W59)

(Note) a) basis for computation:

250,000 DWT turbine tanker

South-bound voyage in ballast

Representative ports – Ras Tanura/Genoa,

Rotterdam, Freeport Bahamas, respectively;

Full steaming, Fuel price \$160/t;

Stay at and transit through Suez – total 2 days;

Current canal toll.

b) Size of ship, slow-steaming and fuel price have no appreciable effects, while the number of days at and through the Suez, and canal toll have a big effect.

c) The worldscale rates (in brackets) are expressed in terms of the world scale tariff. The figures before Dec. 1979 are on the left side, while those after Jan. 1980 are on the right side.

(2) Bulk carrier

Loaded large bulk-carriers passing through the canal are engaged in such trades as iron ore and coal between Australia and Europe, and of iron ore between Goa, India and Europe.

The dividing points are;

Australia/Europe	130,000 DWT	\$10.55
India/Europe	60,000 DWT	\$4.16

(Note) Representative ports

Australia; Average of Port Dampier and Haypoint

India: Madras; others; same as tanker

4-3-2 Freight Market of Large Sized Ships

- (1) The VLCC tanker market in 1976 – 1979 which was basically, in a state of over-tonnage, showed a slight recovery after mid 1978 and especially in the latter half of 1979, because somewhat prosperous. However, it turned sluggish in February 1980 due to decreased consumption and stockpiling full of oil in the consuming countries.

From the view point of the dividing point mentioned above, until around July 1978 the market was below the dividing point for N.W. Europe, while the Suez route was slightly more advantageous for Mediterranean ports.

Since then, however, the market has stayed above the dividing point for N.W. Europe, but has not yet reached the dividing point for Caribbean Sea.

Influenced by the increased in fuel prices (\$80/ton – \$160/ton), the lower limit of the market has risen to approx. W30 – W35 from approx. W20 before the fuel price increases. This strengthened the competitive power of the Suez route for the future outlook. (See the paragraph on Ship-Tonnage Demand-Supply)

- (2) The freight market of Australia/Europe 130,000 DWT ore-carrier trade had been long sluggish but it went up at last above the dividing point in the latter half of 1979.

Since an increased needed for coal transportation is foreseen and demand for large bulk carriers is expected to increase in the future, there will be a favorable effect on large ore carriers and ore/oil carriers. In the long run, it is expected that a level above the dividing point will be virtually maintained.

- (Note) For further details regarding the above mentioned analysis please refer to the following documents

Report on Technical Cooperation Program to
Suez Canal Authority, March 1979, Feb. 1980

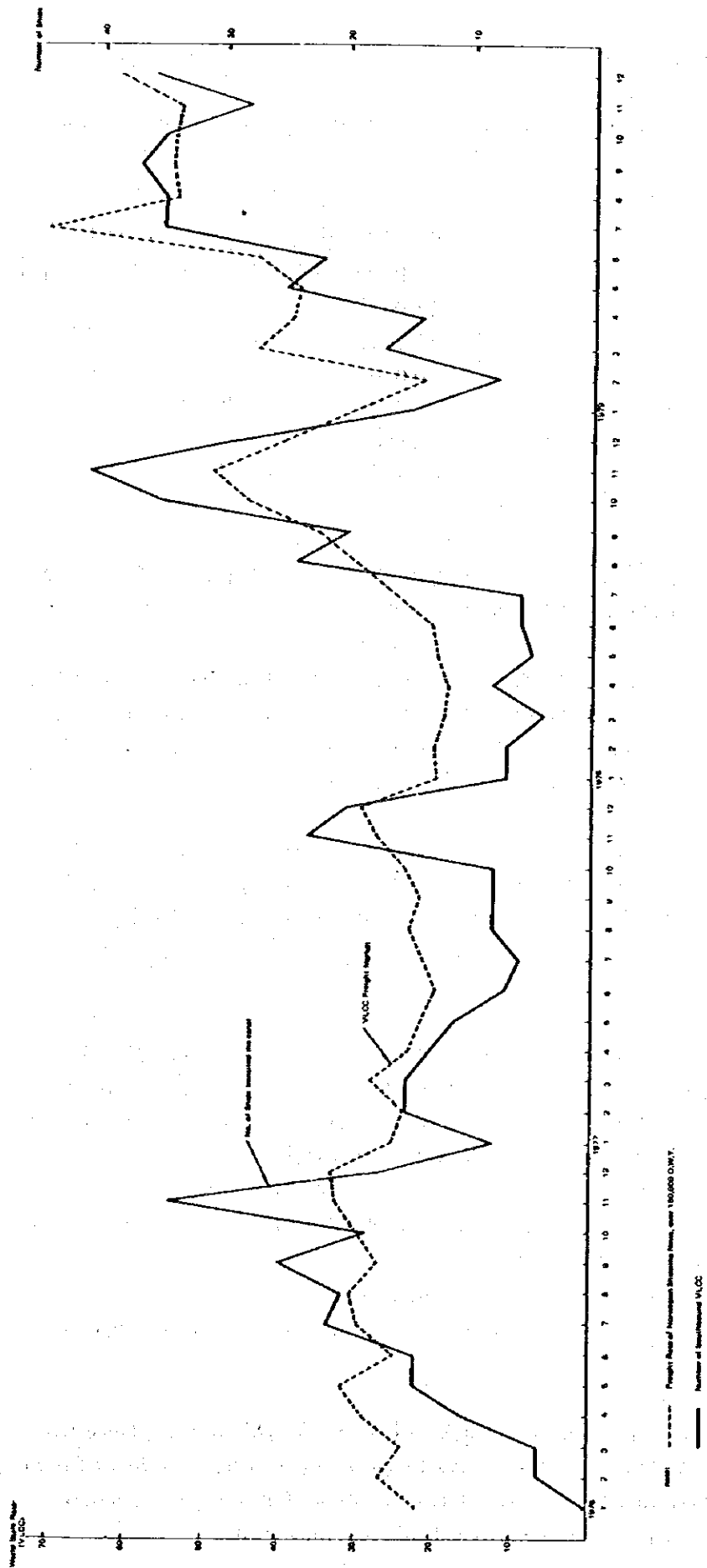


Figure 4-4-1 Correlation of Freight Rate Level and Number of Transit VLCC

4-4 Maritime Transportation Cost

(1) The maritime transportation cost shall be computed, taking the following sizes of ships as representative:

Tanker	Bulk Carrier	General Cargo Ship
30,000 DWT	15,000 DWT	10,000 DWT
100,000	25,000	
200,000	35,000	
275,000	50,000	
325,000	80,000	
375,000	120,000	
425,000		
500,000		

(2) Maritime transportation costs are computed on the 1979 price basis. The current status and the future prospect of each cost item are as follows:

1) Ship price:

As the tanker market recovers, the ship price will inevitably go up at a higher rate than general inflation. Furthermore, the tanker building price will go up by 10–25% due to the compulsory installment of segregated ballast tanks, crude oil washing equipment, etc. in accordance with IMCO regulations.

2) Crew expenses:

The annual wages for crew range from \$400,000 to \$1,200,000 according to nationality. Here, crew expenses for a tanker are computed on the basis of employing officers from developed countries and other crew from developing countries. For other types of ships, all officers and crew are regarded as coming from developing countries.

3) Fuel cost:

Fuel cost is naturally linked with oil price, and in general, a rapid increase of oil price is anticipated. On the other hand, diesel will be increasingly preferred for newly built large ships and the fuel efficiency of a diesel engine itself will improve. These would offset the rapid increase in fuel cost to some extent.

4) Lubrication cost:

Though this cost also moves with oil price, its effect on the total cost is negligible because its amount is small.

5) Stores, insurance, repair, administration cost, etc:

In the long run, these will show increase rates, similarly to those of consumer prices or wages increases.

6) Interest:

Interest on export loans for dockyards is fixed at 8% in accordance with the OECD agreement. There are other ways to raise money such as by loans from city banks, eurodollar, etc., whose interest rate fluctuates depending upon economic situations, but 8% would be reasonable as a standard in long-term.

4-5 Changes in Type and Size of Ship

4-5-1 Share of Ships by Type on Each Commodity

Our survey as to transportation percentage by type of ship and by cargo through the Suez Canal for July 1978 put forth the result as shown in Table 4-5-10, by which the future goods traffic through the Canal is reflected in the changes of ship type.

4-5-2 Shift to Container Ship from General Cargo Ship

With respect to the computation of ship tonnage by type of ship, the problem is the percentage of containerization including LASH ships and RO/RO Ships. In this connection, JMRI's 1978 survey showed that in Japan's case, the containerization of general cargo was 30%. Taking this into consideration, it is assumed that in 2000, containerization will rise to 30% from the current 17.8% (in this case, rate of full container ship is 25.5%). The share of general cargo ships will decrease to 49.6% from the current 61.8%, thus changing the component ratio of types of ships.

Particularly as regards the Middle East, it is expected that containerization or shift from conventional type of ships to container ships will take place faster than estimated above, if container facilities in this area are improved very rapidly. Another unforeseeable factor is the possibility of development of inland container transportation from the Mediterranean coast to the Middle East. If that happens, it will mean the appearance of a route which competes with Suez Canal.

4-5-3 Distribution of Ship Sizes

(1) The study on the distribution of ship size by type of ships was based on the data provided by SCA on actual passage in 1978, with some special considerations made. The distribution is shown in Table 4-5-12.

- 1) As to tankers, the distribution by size of ships sailing via Suez and Cape is assumed as shown in Table 4-5-7 based on data obtained by the Japan Maritime Research Institute.
- 2) As to bulk carriers, the distribution of large size ships passing the Canal after completion of the First Stage Project and the current distribution were weight-averaged as shown in Table 4-5-12.

Sizes	30-40	40-50	50-60	60-70	70-80	80--	Total
(Additional traffic)	2,050	940	2,180	1,680	910	290	8,050 10^3 N/T
(1978 traffic)							36,783 10^3 N/T

- 3) As to combination carriers which are operated as tankers or bulk carriers, they are included in either of these two types of ships.
- 4) As to other types of ships, SCA material is used.

(5) With respect to the increase in ship's size, an average increase of about 20% is assumed up to the year 2000. The extent of increase is set by type of ships. For general cargo ships etc., whose average size is small, the extent of size increase is set higher, while for bulk carriers etc., whose average size is large, the extent of increase is set lower. the size distribution in 2000 is shown in Table 4-5-12.

The reason why it is assumed that there will be no increase in the size of tankers is that cases of multiport loading/discharging of large tankers are increasing and the merit of size increase is being lost. Therefore, tanker companies point out that the increase in size is now not necessarily advantageous. Also, another reason is that government to government deals (G.G.) and direct deals (D.D.) of oil trade will increase in the future, and cargo lots will become smaller, this making large tankers conceivably less advantageous than in the past.

Table 4-4-8 VLCC Freight Index 1976 - '80

	(world scale)				
	1976	1977	1978	1979	1980
1	22.1	25.6	20.4	31.4	49.8
2	27.2	24.5	20.6	22.2	34.0
3	24.2	28.8	19.5	43.9	33.7
4	29.4	23.8	19.0	39.3	32.9
5	32.0	22.2	20.3	38.4	
6	25.3	20.4	21.2	43.9	
7	30.0	22.0	26.3	71.1	
8	31.2	23.9	31.0	54.4	
9	27.7	22.6	35.9	54.9	
10	30.2	24.6	44.9	54.5	
11	33.0	28.2	49.8	53.7	
12	33.6	30.2	40.0	61.8	
Average	28.8	24.7	29.1	47.5	

Source: Norwegian Shipping News

Table 4-4-9 Cost Items of Representative Types of Ships

Type of ship	L/T	Tanker									
		30,000	100,000	200,000	275,000	325,000	375,000	425,000	500,000		
Loadable quantity	L/T	28,000	95,000	193,000	266,000	315,000	364,000	413,000	485,000		
Working day	day/year	340	340	340	340	340	340	340	340		
Days of loading	day/voyage	1.5	2.0	2.0	2.5	2.5	3.0	3.0	3.0		
Days for discharging	day/voyage	2.0	3.0	3.0	3.5	3.5	4.0	4.0	4.0		
Speed loaded	mile/hour	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5		
Speed in ballast	mile/hour	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5		
Contract price	10 ³ \$	15,000	30,000	43,000	51,000	56,000	61,000	67,000	80,000		
Fitting out expense rate	%	5	5	5	5	5	5	5	5		
Amortization/year	%	8	8	8	8	8	8	8	8		
Interest rate	%	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4		
Insurance	%	1.2	1.3	1.35	1.4	1.4	1.45	1.45	1.5		
Crew expense	10 ³ \$/year	560	600	620	620	620	640	640	660		
Stores	10 ³ \$/year	40	60	80	85	90	100	110	120		
Lub. oil	10 ³ \$/year	60	120	180	7	8	8	9	10		
Repair	10 ³ \$/year	380	500	590	665	715	755	805	880		
Administration fee	10 ³ \$/year	140	160	195	220	235	250	265	280		
F.O. price	\$/ton	160	160	160	160	160	160	160	160		
F.O. consumption at sea	ton/day	38	75	108	150	165	180	190	200		
F.O. consumption in port	ton/day	20	40	60	70	80	83	95	111		

Type of ship	L/T	General Cargo ship	Bulk Carrier					
			15,000	25,000	35,000	50,000	80,000	120,000
Loadable quantity	L/T	9,300	14,000	23,500	33,000	48,000	77,000	115,000
Working day	day/year	350	350	350	350	350	350	350
Days for loading	day/voyage	5	4	4	4	3	3	3
Days for discharging	day/voyage	5	4	4	4	4	5	5
Speed loaded	mile/hour	15	14	14	14	14	14	14
Speed in ballast	mile/hour	16	15	15	15	15	15	15
Contract price	10 ³ \$	13,600	10,800	13,000	15,400	17,500	21,600	27,600
Fitting out expense rate	%	5	5	5	5	5	5	5
Amortization/year	%	6	6	6	6	6	6	6
Interest rate	%	4.8	4.8	4.8	4.8	4.8	4.8	4.8
Insurance	%	1.0	1.0	1.0	1.0	1.0	1.2	1.2
Crew expense	10 ³ \$/year	400	400	420	420	420	420	420
Stores	10 ³ \$/year	16	13	18	22	28	38	50
Lub. oil	10 ³ \$/year	35	35	50	65	80	100	115
Repair	10 ³ \$/year	24	19	23	27	31	36	44
Administration fee	10 ³ \$/year	80	60	72	81	91	106	120
F.O. price	\$/ton	160	160	160	160	160	160	160
F.O. consumption at sea	ton/day	23	23	33	42	52	65	75
F.O. consumption in port	ton/day	6	6	6	6	8	10	12

4-6 Concluding Remarks

The Canal traffic tonnage of large bulk carriers and VLCCs is strongly influenced by the maritime freight market. In order to estimate the future freight market and to set up a standard for route selection, in this Chapter the transportation cost is calculated on a total of 15 cases involving tankers of eight sizes, bulk carriers of six sizes, and general cargo ship of one size.

Regarding the future trend of the supply-demand balance of ships which has a direct impact on the freight rate, this Chapter tries to obtain a grasp of the future freight market trend by estimating when the supply-demand relation in the tanker and dry bulk sectors will reach a state of balance.

In the very large tanker sector, such factors as changes in production and price of oil, conservation of oil, the reduction in transport distance as a result of newly developed supply sources and IMCO regulations were taken into consideration and the conclusion was reached that a balance will be attained after the mid-1980s.

In the large dry bulk carrier sector, it is believed that supply-demand balance will be achieved at an early date in view of an expected increase in coal shipments in the future.

In both sectors, the supply-demand gap has already disappeared with respect to medium- and small-sized ship markets.

5. Suez Canal Traffic Forecast

5-1 General

The Second Stage Development Project is expected to increase both traffic volume and revenue in the future by increasing the canal transit capacity.

This chapter is intended to forecast the number of transits and the revenue, showing the methodology, premises and results of forecasting.

The results of forecasting contained in this chapter will be used as basic data for the formulation of the Second Stage Development Project, economic evaluation, revenue analysis and financial analysis.

Traffic forecasting includes the following steps for analysis and forecasting:

- 1) The world supply and demand of energy and the oil trade,
- 2) Trends in the world economy and the dry cargo trade,
- 3) Route choices based on the shipping cost and market,
- 4) Suez Canal cargo traffic categorized by commodity,
- 5) Number of transits by vessel category, and
- 6) Suez Canal revenue.

The flow of traffic demand forecasting is shown in Fig. 4-5-1.

In this chapter, forecasting of the number of transits and revenue is done on the basis of the marine cargo volume relating to the Suez Canal (Chapter 3), shipping cost, market and fleet mix (Chapter 4).

For the computation of the anticipated revenue the number of transits is forecasted according to the classifications below,

- a) Southbound or northbound,
- b) Vessel category,
- c) Vessel size,
- d) Laden or in ballast.

The number of transits may be determined through two methods. Firstly, the number of transits (potential number of transits) without restrictions on the canal capacity is to be forecast. Secondly, the actual number of transits under restrictions on the canal capacity is to be forecast.

In this Chapter, however, only the results of the forecasting of the potential number of transits and the potential revenue will be given.

The results of the forecasting of the number of transits and the revenue under the restrictions on the canal capacity placed by either the First Stage Project or the Second Stage Project will be given in Part XII (Sensitivity Analysis of Canal Revenue).

Categorization of commodities and of vessels in forecasting the traffic volume is based on Tables 4-5-1 and 4-5-2.

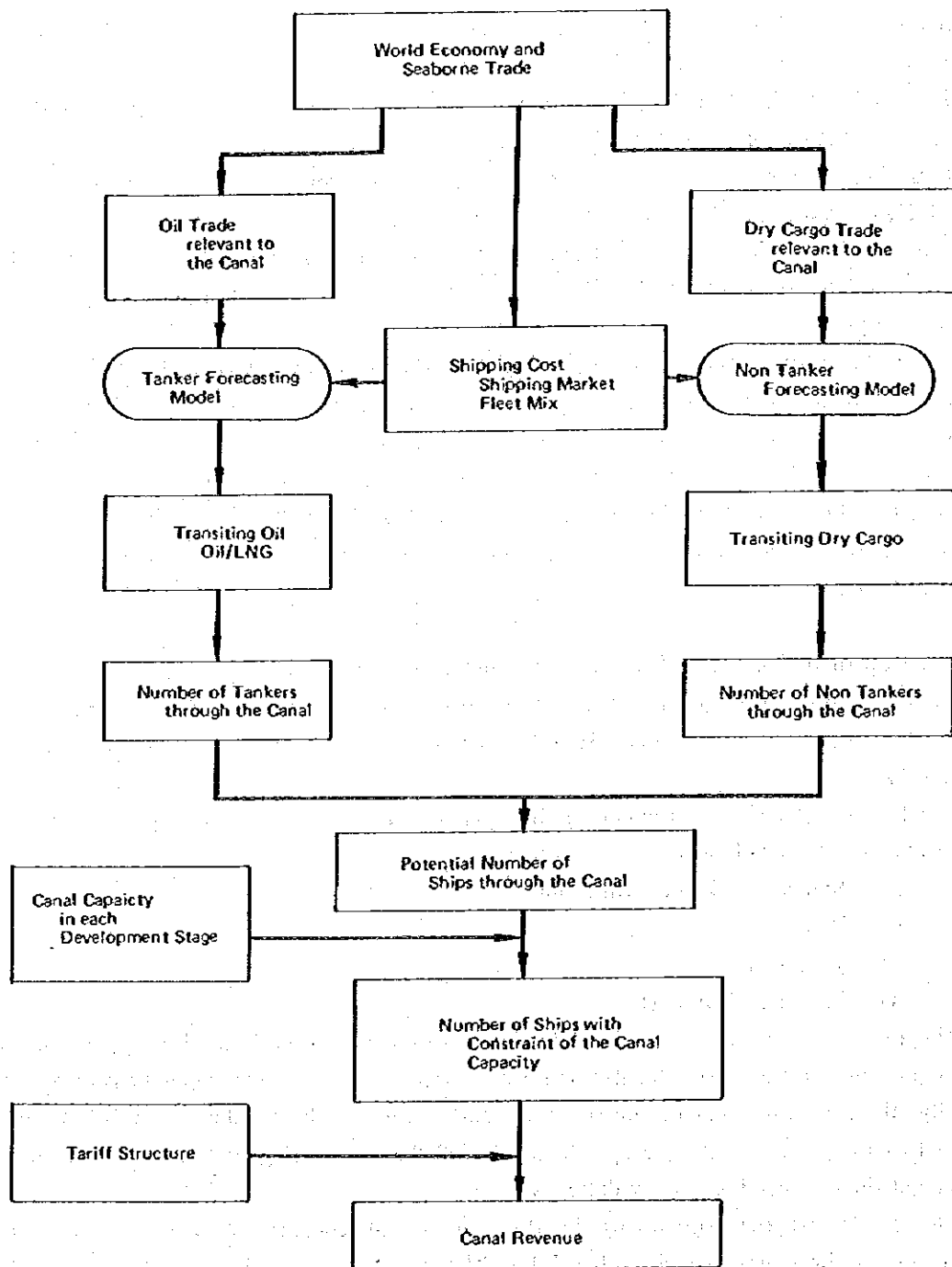


Fig. 4-5-1 Flow of Long Term Traffic Forecasting

Table 4-5-1 Category of Commodity

No.	Category	Vessel
1	Oil, LNG	Tanker/LNG Tanker
2	Iron Ore	Non Tanker
3	Cereals	
4	Fabricated Metal	
5	Cement	
6	Fertilizer	
7	Coal	
8	Others	

Table 4-5-2 Category of Vessels

No.	Category	Vessels
1	Tanker	Tanker, LNG Tanker
2	Bulk Carrier	Bulk Carrier
3	General Cargo	General Cargo
4	Others	Containers Lash RO/RO Car Carriers Others