DATA AND ANALYSIS

OF

THE COMPREHENSIVE STUDY

FOR SHIPPING & SHIPBUILDING DEVELOPMENT

IN THE ISLAMIC REPUBLIC OF PAKISTAN

JAPAN INTERNATIONAL COOPERATION AGENCY

OCTOBER, 1979

"Data and Analysis" CORRECTION TABLE

Page	Position Para., Line	Error	Corrected
10	3rd, 1	... and indirect analyses ...	and indirect analysis
21	CHART 22(4)	Total Cargo enrouted for USA/Canada 1	Total Cargo enrouted for USA/Canada 2
		Total Cargo enrouted in North America 2	Total Cargo enrouted in North America 1
37	in table of Production capacity	Steel Ton (per Head) 5.4	Steel Ton (per Head) #5.4
		Working HR (per Day) 4.9	Working HR (per Day) #4.9
38	1st, 4-5	Shop Capacity $Qk=Qj \times \frac{Ak}{Aj} \times \frac{Bk}{Bj} \times \frac{Ci}{Ck}$	Shop Capacity $Qk=Qj \times \frac{Ak}{Aj} \times \frac{Bk}{Bj} \times \frac{Cj}{Ck}$
		$\frac{Qk}{Qj} \frac{Ak}{Aj} \times \frac{Bk}{Bj} \times \frac{Cj}{Ck}$	$\frac{Qk}{Qj} = \frac{Ak}{Aj} \times \frac{Bk}{Bj} \times \frac{Cj}{Ck}$
49	1st, 9	... in PART II ...	in PART iii ...
	2nd, 6	... in PART II.	in PART III.
100	1st, 2	... of nationlizing ...	... of nationalizing...
169	3rd, 3	of 26,000 TDW	of 27,000 TDW
178	2nd, 4	$Qk = Qj \times \frac{Ak}{Aj} \times \frac{Bk}{Bj} \times \frac{Ci}{Ck}$	$Qk = Qj \times \frac{Ak}{Aj} \times \frac{Bk}{Bj} \times \frac{Cj}{Ck}$
182	2nd, 5	... and labor borce ...	... and labor force ...
183	3rd, 3	... to Karachi Steel Works ..	... to Karachi Steel Mill ...
184	2nd, 2	... of Karachi Steel Works, .	... of Karachi Steel Mill, ..
199	1st, 6	X(USS Million): ...	X(US$ Million): ...
219	2nd, 4	... in Chapter III-4,...	... in Chapter III-3, ...
221	in 1-1-3, 2	... in Chapter VI ...	... in Chapter IV ...
222	in Remarks	... US$14 million dollars ..	... US$14 million ...
	2nd in 1-1-4 3	Chapter VI.	Chapter IV.

Data and Analysis
of
The Comprehensive Study
for
Shipping & Shipbuilding Development
in
The Islamic Republic of Pakistan

- TABLE OF CONTENTS -

PART I. ILLUSTRATIONS EXTRACTED FROM ANALYTICAL WORK

- TABLE OF CONTENTS -

- TABLE OF CONTENTS (Cont'd) -

PART I. ILLUSTRATIONS EXTRACTED FROM ANALYTICAL WORK

I. INTRODUCTION

The PART I, along with the following PART II and PART III, constitutes the text of "the Report on Study of Development Plan of Shipping and Shipbuilding Industries in the Islamic Republic of Pakistan (hereinafter referred to as Pakistan)".

In this PART I is mentioned, in the main, fundamentals in the most pertinent and appropriate orientation for "Development Plan" drawn from any analysis of materials of our research and various data obtained from other sources, and the summary of planning based on them.

In general, many-sided and complicated elements are involved in shipping and shipbuilding industries in every country. Pakistan is by no means an exception. In particular, as external factors, (1) this country is located in West Asia and by her geographical and historical conditions, she is very deeply connected in trade with Europe and Asia of course, and Africa too. Basides, her trade with America is not ignored in the recent years. And, (2) the country, sharing the religious background with Arab-Middle East, has recently been prompting her economic relation with the said areas, also. On the other hand, we cannot overlook the following internal factors, hampering the formulation of future development sequences. Namely, (3) provision of statistical materials and other data indispensable for identifying her economic behaviors is far from complete. And, (4) the country's economy has not yet get off mono-cultural type, and her economic fundation is unstable. These internal factors made it very difficult to forecast the future development trend.

This study is divided into three parts - PART I summarizes the text into two factors, as mentioned at the head of this description, and the others are PART II and PART III, compiling all the data and analytical work in the study. For each of the above three, the study is segmented as to points of discussions and contents, because such complication of external and internal factors, as is prevailing in this country, is liable to be amplified by many-sidedness and complexity of each field/aspect and each problem/factor, which are necessary for the development of

Shipping and Shipbuilding Industries and thereby worth-while supporting. In this issue the study tried to summarize itself into two points, i.e. an explanation of fundamental orientation of the "Development Plan", and a description of the outline of planning based on them as concise as possible, and PART II and PART III of data and analysis the study mentioned the source and the background of plannings in the PART I together with a detailed analysis of economic activity in Pakistan and a deductive forecast for the future. The reason for all of this is that the study wanted to avoid as much as possible confusions liable to be caused by the aforesaid complexity and reciprocal amplification.

The study would like to emphasize that there is a problem of adjusting and coordinating the actualities found in our on-the-spot survey with various data from abroad, upon which the study has to rely because of a scarcity of statistical materials in this country. Such adjustment and coordination inseparably correlates with the future forecast, and requires to adopt an analytical technology, to as far an extent as possible, including computer simulation, and to practice innmerable trial and verifying calculations. To contain such complicated procedures in one volume is liable to confuse even extracting of the fundamentals for "Development Plan". This is another reason why this study is divided into three PARTS.

It goes without saying that trial and verifying calculations were not carried out dogmatically. In the first place, these calculations are based upon the data analytical technology together with the broad experience in advanced shipping and shipbuilding industries, both of which constitute the main reason why the Government of Pakistan asked the Government of Japan for a cooperation in the research. And the second, Japanese specialist teams visited Pakistan twice and tried to seek the ways for adapting their own technic and experience to the actual situation on the spot, surveying the facts jointly with Pakistan specialist groups to be conversant with the reality of the country. Third, useful information and advices were offered not only by specialist groups and others of both countries directly engaged in the research and the analytical works, but also by experts and the like concerned of both countries or

of other nationalities who are closely connected with shipping and shipbuilding industries in Pakistan. These trail and verifying calculations are nothing but a numerical outcorp of these direct and indirect works combined with the efforts by all the people concerned. Also, they are nothing but supplements as far as possible for insufficient portions of various data unavoidable at the present, and their justification.

This issue is, in other words, only a part of the outcrop above-mentioned. However, it is indeed a crystal of enormous work by a number of people in broad circles. Compilation of the text in this issue and the following issue of data and analysis was done in Japan in the main, while their contents were elaborated by joint work of Pakistan and Japanese specialists. Names of specialists of both nations directly engaged in this survey are listed at the end of the following PART dealing with analytical work. But the study, as a whole, could not have been completed without cooperation and advice from the people indirectly concerned of both nations and of other nationalities. Points and contents of this PART and analytical work of PARTS II & III are as above mentioned. Fundamental postures of both nations for "Study of Development Plan", and a concrete approach to it, are treated on the basis of "Scope of Work" compiled in accordance with the verbal note exchanged between the Governments of both nations. This "Scope of Work" is contained in Chapter VI in the last part of PART II.

This sort of study makes it a rule, by nature, to be conducted over short, middle, and long terms. But it is carried out in the scope dated up to 1983 in accordance with the aforesaid "Scope of Work" for the time being, and also in the wider scope extending over 1983 as occasion demands to do so. Also, this work is conducted, in its fundamental approach, on the premise of the obedience to the order of the International Shipping Conferences in which Pakistan and Japan participate. Accordingly, in the case where any deviation from this order is seen, analysis and planning by this study might become quite different from what was mentioned there, although nothing was said about it. Surely, such deviation would be undesirable for upkeep and development not only of the international order in shipping world, but also of the world economy. This study

plainly indicates, however, that Pakistan is endowed with ability and possibility for sufficient development even within this system of order.

II. A FUNDAMENTAL ORIENTATION FOR THE DEVELOPMENT PLAN AND A SKETCH OF ITS EFFECTIVENESS

This Chapter II deals with and consolidates the most fundamental orientations necessary for the development of shipping and shipbuilding in Pakistan, and an abstract of the planning based upon the said orientations together with a brief of expected effects in its implementations. The fundamental orientations, an abstract of the planning based on those and a physical development of the expected effects are described in Chap. III, while a fiscal development of such effects is in Chap. V.

This Chapter refers to, (1) in terms of trade volume, an analysis and an estimation of quantitative achievements and needs and (2) in terms of a fleet, the same study of achievements and needs of transportation corresponding to the above trade volume together with a projected capability of shipbuilding in Pakistan herself. Then, it also mentions, (3) in view of financing, an estimation of investments and their profitability, and (4) in the final section, reaches a conclusion including a review of the fundamental orientations and the abstract of the planning formerly discussed.

As a matter of course, the above-mentioned analysis/estimation and investments/profitability are based upon the moves of national economy in the past and predictions in the future. The Fifth Five Year Plan (1978 - 1983) is now under way, and the growth rate of GDP is set at 7.0% on a yearly average. However, taking account of the above rate and as many indices of national economy, industries and society as available and after a series of cross-examinations, this paper adopts the planning on the basis of 4.64% growth rate of GDP on a yearly average.

Some difference between the future image (planning target) and the same of this study (prediction) has been induced not because of our negligence of the former, but because of the consideration that this plan should aim at something attainable in practical way although it is a top priority for Pakistan, and that this figure of GDP growth should not be excessive, but be sound enough in all respects.

These details are described in PART II "Analytical Work". In case the average growth rate exceeds the assumed value in this study, it is quite easy to convert the predicted results based on 4.64% into something at another higher rate. Even in such a case, however, careful comparisons between the actual results and the planning and also between the projected needs and their attainability will become indispensable, and the basic rule "not excessive but sound" will still prevail. The fundamental orientations for the development of shipping and shipbuilding in Pakistan should, in a short word, be steered toward the sound and steady development in all respects.

1 IN TERMS OF TRADE VOLUME

1-1 Cargo Movement

On the basis of actual achievements in the past and predictions of the national economy, the past achievements/the forecasts of seaborne transportation are correlated with the following items in Charts/Tables 21(1) to 21(7):

(1) The total cargo movement in the export and the import seaborne trades.

(2) The cargo movement by kind of cargo.

(3) The cargo volume at each port of origin and destination.

(4) The cargo volume on each trade route.

(5) The trade shares of Pakistan flag ships.

(Original data and detailed analyses are to be referred to PART II.)

These results could be summarized, one way through a macroscopic approach and the other through a microscopic one.

Macroscopic Approach

The sectoral growth rates by industry based on 4.64% GDP annual growth rate are indicated as follows:

Primary industries (mainly agriculture)	1.2%
Manufacturing industries	5.8%
Tertiary industries	6.3%

These values correspond to 16.8 million M. Tons of trade volume to be required in 1983, signifying 6.5% growth on a yearly average. This required trade volume could be realized by the growth rates of elemental items listed as follows:

(1) Cargo movement by kind of cargo

General Cargo	4.4%	growth per annum
Liquid Bulk & Dry Bulk	7.1%	ditto

(2) Cargo movement by route

Europe	6.0%	per annum
Asia and Oceania	6.6%	ditto
Middle East and Africa	7.7%	ditto
North America	5.5%	ditto

Microscopic Approach

In parallel with the macroscopic approach as above, the microscopic one is to be made in light of the following:

(1) An external tendency of the world economy.

(2) A detailed analysis of seaborne cargo movement as broken down by type and by kind of cargo.

(3) The trade shares which Pakistan flag ships are expected to obtain.

(4) The cross study of all the figures in comparison with experience and knowledge of many shipping experts.

After various examination in this study being tried, the reliable volumes as of 1983 have been obtained as follows:

(1) Cargo movement by kind of cargo

Kind of Cargo	Cargo Movement (Mill. M. Ton)	An Average Yearly Growth Rate (%)
General Cargo	3.71	4.4
Liquid Bulk	7.91	5.0
Dry Bulk	4.33	11.0
Total Cargo Movement	15.95	6.3

(2) Cargo movement by route

Route	Cargo Movement (Mill. M. Ton)	An Average Yearly Growth Rate (%)
Europe	3.33	6.2
Asia and Oceania	2.91	6.6
Middle East and Africa	7.98	6.3
America	1.06	5.2
Others	0.66	7.1

1-2 Trade Share

In addition to the macroscopic/microscopic approaches, the respective trade shares of the national shipping company on U.K./Europe Shipping Conference route and also on Far East Shipping Conference route are taken into account together with the 40% average share of Pakistan flag ships as set up in the Fifth Five Year Plan.

The most likely figures as of 1983 are tabulated as follows:

(1) Estimated trade-share of Pakistan flags by the kind of cargo in 1978.

Kind of Cargo	Trade Share (%)	Note
General Cargo	28.0	
Dry Bulk	4.1	The cargo for Afghanistan is excluded
Liquid Bulk	-	
Total	7.9	

(2) Projected trade-share of Pakistan flags in respect of cargo by type for the period of 1982/83.

Kind of Cargo	Cargo Movement (1,000 K/T)	Trade Share (%)	Demand (1,000 K/T)
General cargo	3,705	35	1,297
Dry bulk	4,332	14	600
Liquid bulk	7,913	34	2,700
Ore & coal	3,212	20	642
Total	19,162	-	5,239

1-3 Fundamental Orientations

A review of the relation between cargo movement and trade shares implies that a radical increase in trade shares could not always be expected to occur in proportion to the growth of seaborne transportation.

From this point of view, it can be said that such an increase could only be realized either (1) when many newly built ships are brought into service promptly and (2) when the related investments bring about improvements on financial balance of payment and profitability of shipping. These points will be discussed later. Besides the above two decisive conditions, some indirect conditions should be considered likewise. That is to say, (3) the orderly relations to be maintained by the International Freight Conference, (4) the development of containerization, (5) the storage capacity, loading and unloading facilities and working efficiency at ports of destination, and (6) the same at domestic ports, should not be neglected in addition.

The direct and indirect analyses approached in the above 6 aspects indicate that so long as a fundamental outlook is concerned, a hasty input of newly built ships does not necessarily lead to the greatest benefits of all concerned. "The sound and steady development plan" as described at the beginning of this Chapter, could likewise be justified in the discussion from the point of view of cargo movement/trade shares.

2 IN TERMS OF FLEET

2-1 Replacement of Ships

The existing fleet in Pakistan is likely to incur an unbalance in coping with the needs in seaborne transportation regulated by the cargo movement and affected by the trade shares. (cf. Charts 22(1) to 22(4).)

The Fifth Five Year Plan hoists a target of bringing into existence a fleet of 44 ships (590,000 TDW), of which 24 ships (330,000 TDW) are nucleuses to be newly built with an investment of Rs 2750 million in total. However, the above-mentioned study, in which the correlations between the national economy and the required trade volume and between the cargo movement and the trade shares were analyzed, are shown in Chart 22(5) in terms of the needs/fills relation which clearly suggests a big unbalance in the case of the existing fleet.

In the needs/fills denotation, the ratios of correlation between Cargo Volume and GDP and between GDP and General Cargo on liner routes - representative of the seaborne trade in Pakistan - have been adopted in the light of the past achievements and the reliable values of future predictions as follows:

Trade Volume versus GDP	1.39	(an estimated average in Fifth Five Year Plan)
General Cargo or Liner Routes versus GDP	0.955	(" " ")

As for required days for a voyage by route, or inversely yearly number of voyages per one ship, the figures for the past results and the future predictions could justifiably be based upon the following:

Route	Required Days	Yearly Number of Voyages
U.K./Continent	112 (162)	3.23 (2.03)
Asia	114 (134)	3.16 (2.46)
USA/Canada	110 (150)	3.28 (2.20)

N.B. Middle East and Africa are omitted for the reasons that (1) these regions are in a short distance, that (2) the cargoes consist of liquid and bulk (particularly agricultural products) and that (3) trampers including oil tankers practically occupy a great weight.

Besides complying with the above two indicators, three other factors, such as (1) the sea-borne transportation demand/supply based upon the increasing trade volume, (2) the regional sea-borne transportation demand/supply forecasts in line with the trend of the world economy and with development pace of Pakistan economy, and (3) the maintaining of the sailing rights and trade shares indispensable to orderly relations of an international shipping among various Shipping Conferences and the like, should be considered. In this conjunction, the composition of the fleet to be replaced should be planned as mentioned hereunder.

Use of Newly Built Ships

The newly built ships are to be assigned primarily to major liner routes so that auxiliary operation for other routes/services might be temporarily considered.

Type of Newly Built Ships

The most modernized cargo ships (mainly of general cargo and dry bulk cargo) are considered adequate, at least in a short-term view up to 1983.

Size of Newly Built Ships

The 15,000 TDW tonner is considered to be most adequate for the use and the type of newly built ships as deliberated on in the above paragraphs. (Details in Chapters III-2, III-3 in PART II.)

Number of Newly Built Ships

16 ships are taken into consideration for the time being - until 1983 or the first half of 1984.

With - Restraints

The projected ship procurement plan had better be implemented at an early and suitable opportunity in view of the present sluggish market of the world shipbuilding. However, Pakistan has a shipyard designed for building 27,000 TDW, 15,000 TDW and 6,000 TDW types one per each per annum, and the role of the shipyard would be important for the development of the heavy industry in Pakistan in the future as well as in the past.

In the light of these facts, a suitable number of the planned ships might be desired to be domestically built, preferably by means of repetitive production of sister ships of identical design, which seems to be within the capacity of Pakistan.

In other words, the ships obtained from the world-wide market must be of a prototype peculiary suitable for building domestically. The suitable number to be built domestically is 4 for the short term view up to 1983 (Please refer to the details in Chapters IV-2 in PART II.).

As for the reservation related to the above paragraphs, an overall explanation is given in the following Chapter II-2-2 and its foundation is shown in the relevant Chapters in PART II.

2-2 Profitability of New Building and Operation of Ships

The total building cost necessary for implementing the ship replacement plan will amount to about US$226.2 million on the basis of US$14 million/ship as an average market price at the time of this study. In this connection, an appropriation of funds and payment terms regulating the shipbuilding payment are shown in Table 31. The above building cost is based on a premise that the procurement cost per ship is all the same with the ship built abroad as with the one built domestically which was referred to in the preceding paragraph "With - Restraints".

In reality, the building cost in Pakistan is some US$16.6 million - US$14.0 million = US$2.6 million per ship higher than the average price of the world market at the time when the Study Team made the survey. In Pakistan, however, there are facilities of subsidizing the cost differential within the limit of 30% of the building cost when the domestic manufacturing cost exceeds the world market price. The limit of the subsidy would, however, be better flexible as to meet the existing yard environment. Therefore, in this paper the building cost may well be assumed to be same in both the cases. On the other hand, in view of an overall growth of the national economy, any subsidiary measures for the cost differential between foreign and domestic building would result in increasing the load on the people, and should therefore be reduced as far as practicable. This expected process is shown in Chapter V-2.

A sound estimation of the operation profitability of the ships under the burden of the above-mentioned building cost will be given in Table 32.

In this consideration, which is connected with "Use of Newly Built Ships" in Chapter II-2-1 and its background and also with "Consideration on Ship Cargo", the freight income and other operational particulars of the 16 ships serving on U.K./Continent, Asia and USA/Canada Routes are estimated as of the time when the said 16 ships enter service as a complete fleet in 1984 as listed hereunder.

The right hand column gives the corresponding figures of NSC's ships in service as of 1976/77.

Routes and Other Particulars	Fleet of New Ships	NSC's Figures
U.K./Continent Route:		
* Number of Ships	8	12
* Average Tonnage (TDW)	15,000	12,362
* Number of Voyages, per annum	26.72	21.5
* Cargo Amount, per annum (R/T)	573,048	272,585
* Freight Income, (US$1,000) Total	44,763	21,593
, Per Voyage	1,677	1,004
Asia Routes:		
* Number of Ships	5	11
* Average Tonnage (TDW)	15,000	11,651
* Number of Voyages, per annum	16.4	18.5
* Cargo Amount, per annum (R/T)	386,695	377,499
* Freight Income, Total (US$1,000)	15,493	14,982
, Per Voyage	945	810
U.S.A./Canada Routes:		
* Number of Ships	3	8
* Average Tonnage (TDW)	15,000	13,051
* Number of Voyages, per annum	9.96	9.5
* Cargo Amount, per annum (R/T)	164,286	126,090
* Freight Income, Total (US$1,000)	16,429	12,539
, Per Voyage	1,643	1,320
Total of Three Routes:		
* Number of Ships	16	31
* Average Tonnage (TDW)	15,000	12,287
* Cargo Amount, per annum (R/T)	1,124,029	776,174
* Freight Income, Total (US$1,000)	76,684	49,114
, Per Voyage	1,444	992

In the needs/fillings correlation, the projected newly built 16 vessels in total would, accordingly the comparative figures above-indicated with the reference of Table 31, be justificably profitable if 4 vessels of them were built in the home and the rest came from some other houses.

2-3 Fundamental Orientations

The physical needs and the profitability in filling the needs have so far been studied. This calculation, however, does not include the premise that all the ships should be brought into existence concurrently.

It goes without saying that the continuous efforts toward reaching the planning goal and the good preparation of supporting materials - 16 new ships in this case - should not be neglected at all. On the other hand, however, it is another fact that a hasty and enforced implementation of the plan should naturally be avoided. This is exactly what we previously mentioned about the procurement of the ships to be done as early as possible, but at the most adequate time.

When the building of 16 ships becomes adequate is a very important decision in way of the fundamental orientations, and is to be determined from 3 practical points of view at least: (1) the diffusion of containerization on main trade routes, (2) the continued existence of conventional cargoes and these distribution systems which regulate trade pattern and cargo movement, while the ports of destination could enjoy the benefit of containerization in collecting and handling of cargoes, and (3) the financial condition of Pakistan not only in view of a balance of freight payments or international payments, but also from an overall viewpoint of the national economy.

Concerning the items (1) and (2), this report takes account of these matters in some details. As for the item (3), we could hardly say any further than the fact that Pakistan could

not always afford to pay for the execution of the plan. The total investment budget in the Fifth Five Year Plan are set up at Rs 212,500 million of which about Rs 51,400 million or some 24% must depend upon foreign funds. The total procurement cost of the 16 new ships accounts for - varying dependent upon the escalation terms in payment, etc. - 1.06% of the total investments and 4.41% of the foreign funds.

In the course of planning of this report, it is recommendable that several ships of 13,000-15,000 TDW which are not too old and fit for the purpose of this planning should be regarded as adequate for continuing their service on liner routes. This fact has been a base for our planning.

Accordingly, a thorough inspection of the existing fleet for a re-appraisal of its capability and then a complete and exhaustive repair to be given on the ships really worth while doing it, should be considered as an alternative to the foregoing, by filling a deficiency with chartered ships at times when necessary.

3. SUMMARIZED CONCLUSION

From a physical point of view, we have reached a conclusion that 16 most-modernized cargo ships of 15,000 TDW, which mainly carry general cargo and dry bulk cargo onboard, are so far most appropriate to the planning purpose, and that 12 ships out of those are recommended to be procured abroad while the remaining 4 ships are to be built domestically.

The profitability in this case, as summarized in the relevant tables, does not necessarily coincide with direct or indirect merits of the parties concerned.

If the merits were to come along with the profitability, the results of the analysis would have appeared in a different form. In other words, our conclusion might have been reached so that

all the required ships might be procured abroad, not to speak of the fact that the building cost in Pakistan is 18% higher than the current world average.

The main reasons for deciding the one-fourth of the ships to be built domestically, irrespective of their costwise handicap, are due to the facts that (1) a great contribution can be predicted to the national industrialization, that (2) without a progress of industrialization, the growth of the national economy, as represented by GDP, is likely to stagnate, that (3) in consequence of the stagnation, the instability of trades follows and that (4) a steady and stable development of shipping industry could not be expected in such a trade situation. All these matters occur in a macroscopic vicious circle, an avoidance of which is to be aimed at in the long run.

If any supporting facilities such as subsidies could bring about an even or a positive balance on account books of the parties concerned, it means no doubt an additional load on the national life as well as on the national finance.

In this conjunction, the plan includes the elements serving for reducing the weight of subsidies. The total subsidies to be paid for 4 domestically built ships after the existing institutions and in an expectation of the improved productivity of KSEW, will amount to Rs 63.3 million, equivalent to 5848 men's income for 5 years as calculated on the basis of Rs 2,165 per capita yearly wage as of 1978.

This fact is indicated by the justification of reserving a hasty and excessive attainment of sufficiency in other paragraphs and also by the financial analysis to appear in Chapter V. This fact also has something to do with the interest on the required funds for new ship building.

When the world shipbuilding is now suffering from stagnation, it may not be so difficult to build a ship employing a lower

rate of interest than the one from common private banks, particularly in the case of procurement abroad. This is another reason for our proposal of "as early and adequate a time as possible" in Table 31, but nevertheless such a possibility could not always verify that the required number of ships can be procured under the ordinary conditions. It should be noted that Pakistan, under the burden of US$6,900 million of foreign liabilities as of 1977, would have to add something to the agenda of Inter Governmental Group of Pakistan. The orientation for development plan concentrating into "16 newly built vessels with restraints to the hasty and forced implementation at once: is composed of all of these conditions and correlations as afore-described.

A significant harvest against the development effort would, however, still be enough anticipated even though the moderate GDP's growth rate less than 7.0% per annum.

CHART 21 (1)
TRADE VOLUME AT KARACHI PORT

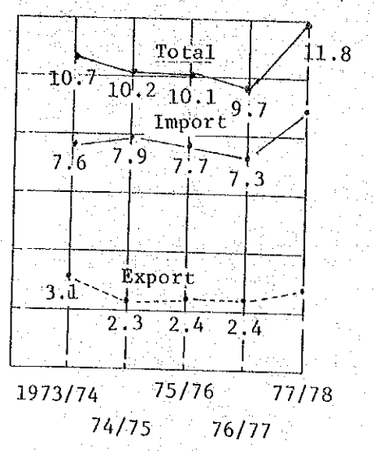


CHART 21 (2)
TRADE VOLUME BY CARGO

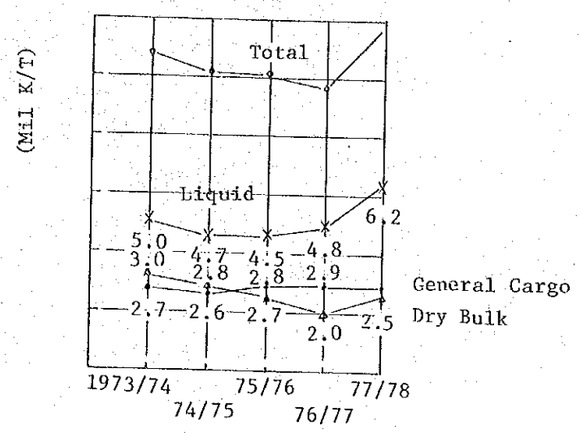


CHART 21 (3)
TRADE AMOUNT SHARE BY REGION

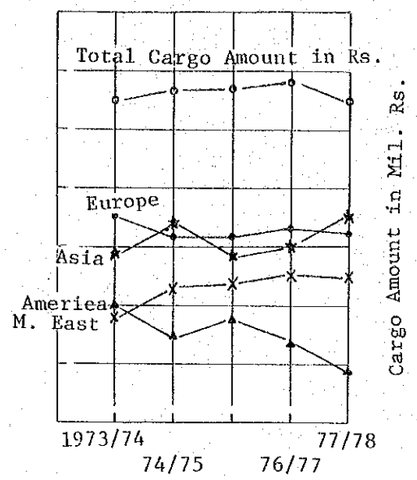


CHART 21 (4)
CARGO SHARE BY FLAG
FIGURES IN () SHOWS SHARE (%)

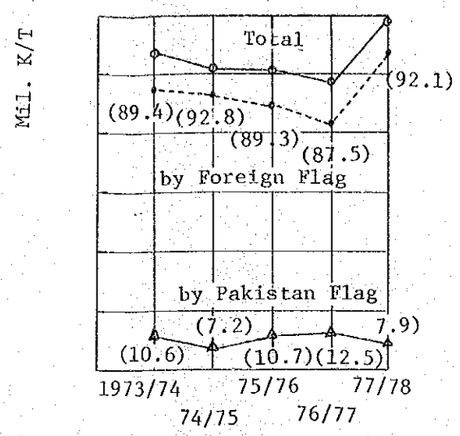


TABLE 21 (5) : COMPUTED ECONO TRADE ESTIMATE

Item \ Year	1978	1979	1980	1981	1982	1983
GDP (10^6 Rs)	44,660	46,900	49,170	51,450	53,730	56,040
Prim Industry (10^6 Rs)	14,580	14,820	15,040	15,220	15,360	15,490
Mfg. Industry (10^6 Rs)	9,200	9,790	10,390	10,990	11,580	12,190
Trital Industry (10^6 Rs)	20,890	22,290	23,750	25,250	26,780	24,360
Trade Total (10^6 K/T)	12,284	13,176	14,088	15,002	15,924	16,795
Trade Import (10^6 K/T)	9,219	9,676	10,130	10,997	11,012	11,574
Trade Export (10^6 K/T)	3,066	3,500	3,954	4,425	4,912	5,221
Cargo General (10^3 K/T)	3,031	3,179	3,334	3,495	3,662	3,765
Cargo, Liq./Dry Bulk (10^3K/T)	9,253	9,997	10,750	11,506	12,262	13,300
En-route Europe (10^3 K/T)	4,260	4,546	4,837	5,128	5,420	5,712
En-route Asia-Oceania (10^3K/T)	3,529	3,790	4,056	4,326	4,597	4,850
En-route M.East & Afr,(10^3K/T)	2,523	2,748	2,978	3,214	3,453	4,650
En-route America (10^3 K/T)	1,969	2,089	2,209	2,329	2,449	2,578

Source: Part II, Chapter I

TABLE 21 (6) : PROJECTED CARGO FLOW BY COMMODITY, OUTLINE

Item	A.G.R.(%)	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83
Cargo Total (10^3K/T)	6.3	11,758	12,482	13,260	14,092	14,987	15,950
" General (")	4.4	2,987	3,118	3,256	3,399	3,548	3,705
" Liquid (")	5.0	6,200	6,510	6,836	7,177	7,536	7,913
" Dry Bulk (")	11.0	2,571	2,854	3,168	3,516	3,903	4,332

Notes: A.G.R. = Annual Growth Rate Dry Bulk for Steel Mill not to be included.

Projected Cargo Flow by Area, Outline

Europe (10^3K/T)	6.2	2,469	2,621	2,782	2,954	3,137	3,331
Asia (")	6.6	2,116	2,256	2,405	2,563	2,732	2,913
Mid. East & Africa (")	6.3	5,879	6,249	6,643	7,061	7,507	7,982
North America (")	5.2	823	866	911	958	1,008	1,060
Others (")	-	471	490	519	556	603	664

Note: Dry Bulk for Steel Mill not to be included.

Projected General Cargo Flow by Area, Outline

Europe (10^3K/T)		1,143	1,193	1,246	1,300	1,357	1,417
Asia (")		1,016	1,060	1,107	1,156	1,206	1,260
North America (")	4.4	380	397	415	433	453	472
Others (")		448	468	488	510	532	556
Total (")		2,987	3,118	3,256	3,399	3,548	3,705

Projected General Cargo Flow by Area, Outline
(Projected Pakistan's Cargo Share of 35% in 1982/83)

Europe (10^3K/T)		320	349	381	416	454	496
Asia (")		284	310	339	370	404	441
North America (")	9.2	106	116	127	138	151	165
Others (")		125	137	149	163	178	195
Total		835	912	996	1,087	1,187	1,297

Projected Cargo Flow for Steel Mill (Ore & Coal)

CANADA, USA, AUSTRALIA, ETC. (10^3K/T)			1,428	2,572	3,212

Source: Part II, Chapter II

CHART 21 (3)
TRADE AMOUNT SHARE BY REGION

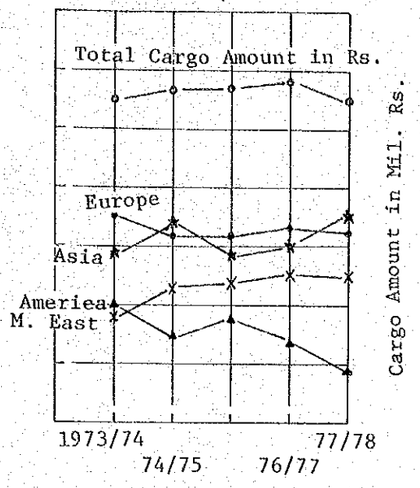


CHART 21 (4)
CARGO SHARE BY FLAG
FIGURES IN ( ) SHOWS SHARE (%)

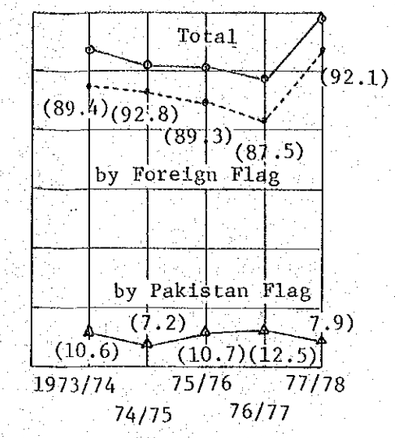


TABLE 21 (6) : PROJECTED CARGO FLOW BY COMMODITY, OUTLINE

Item	A.G.R.(%)	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83
Cargo Total (10^3K/T)	6.3	11,758	12,482	13,260	14,092	14,987	15,950
" General (")	4.4	2,987	3,118	3,256	3,399	3,548	3,705
" Liquid (")	5.0	6,200	6,510	6,836	7,177	7,536	7,913
" Dry Bulk (")	11.0	2,571	2,854	3,168	3,516	3,903	4,332

Notes: A.G.R. = Annual Growth Rate Dry Bulk for Steel Mill not to be included.

Projected Cargo Flow by Area, Outline

Europe (10^3K/T)	6.2	2,469	2,621	2,782	2,954	3,137	3,331
Asia (")	6.6	2,116	2,256	2,405	2,563	2,732	2,913
Mid. East & Africa (")	6.3	5,879	6,249	6,643	7,061	7,507	7,982
North America (")	5.2	823	866	911	958	1,008	1,060
Others (")	-	471	490	519	556	603	664

Note: Dry Bulk for Steel Mill not to be included.

Projected General Cargo Flow by Area, Outline

Europe (10^3K/T)		1,143	1,193	1,246	1,300	1,357	1,417
Asia (")		1,016	1,060	1,107	1,156	1,206	1,260
North America (")	4.4	380	397	415	433	453	472
Others (")		448	468	488	510	532	556
Total (")		2,987	3,118	3,256	3,399	3,548	3,705

Projected General Cargo Flow by Area, Outline
(Projected Pakistan's Cargo Share of 35% in 1982/83)

Europe (10^3K/T)		320	349	381	416	454	496
Asia (")		284	310	339	370	404	441
North America (")	9.2	106	116	127	138	151	165
Others (")		125	137	149	163	178	195
Total		835	912	996	1,087	1,187	1,297

Projected Cargo Flow for Steel Mill (Ore & Coal)

CANADA, USA, AUSTRALIA, ETC. (10^3K/T)			1,428	2,572	3,212

Source: Part II, Chapter II

TABLE 21 (7) : PROJECTED CARGO FLOW, BREAKDOWN

Item	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83
Cargo Total	11,758	12,482	13,260	14,092	14,987	15,950
" Import	8,918	9,329	9,739	10,207	10,676	11,166
" Export	2,840	3,153	3,501	3,885	4,311	4,784
Europe, Total	2,469	2,621	2,782	2,954	3,137	3,331
General Cargo	1,143	1,193	1,246	1,300	1,357	1,417
Dry & Liquid Bulk	1,326	1,428	1,536	1,654	1,780	1,914
Asia Total	2,116	2,256	2,405	2,563	2,732	2,913
General Cargo	1,016	1,060	1,107	1,156	1,206	1,260
Dry & Liquid Bulk	1,100	1,196	1,298	1,407	1,526	1,653
Middle East & Africa Total	5,879	6,249	6,643	7,061	7,507	7,982
General Cargo	294	313	333	353	375	399
Dry & Liquid Bulk	5,585	5,936	6,310	6,708	7,132	7,583
North America Total	823	866	911	958	1,008	1,060
General Cargo	380	397	415	433	453	472
Dry & Liquid Bulk	443	469	496	525	555	588
Others	471	490	519	556	603	664

Note: Dry Bulk for Steel Mill not to be included.

By Pakistan Flag in 1982/83 (Projected)

General Cargo (Share: 35%)

Europe (10^3K/T)		496
Asia (")		441
North America (")		165
Others (")		195
Total (")		1,297

Dry Bulk (Share: 14%)

Total (10^3K/T)		600

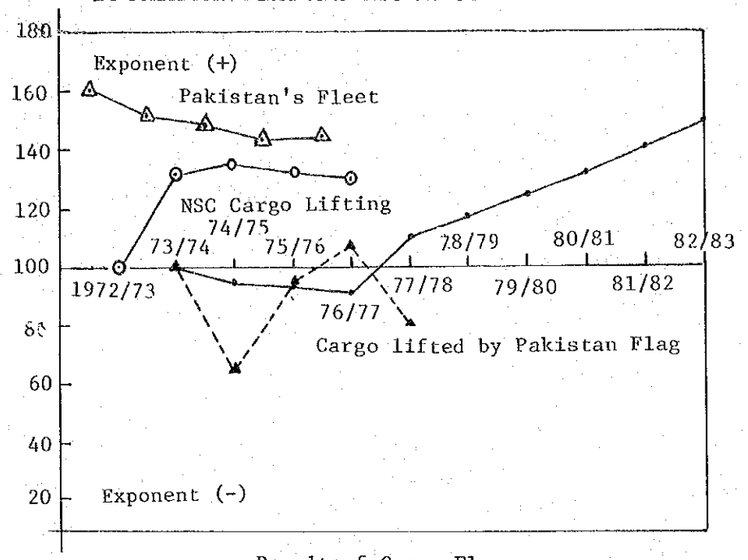
Liquid Bulk (Share: 34%)

Total (10^3K/T)		2,700

Dry Bulk for Steel Mill (Share: 20%)

Total (10^3K/T)		642

CHART 22 (1) INDEX COMPARISON FOR CARGO MOVEMENT, CARGO VOLUME BY PASISTAN FLAG AND NSC CARGO LIFTING



Result of Cargo Flow

	1973/74	1974/75	1975/76	1976/77	1977/78
Total Cargo Volume (10^3K/T)	10,682	10,158	10,076	9,704	11,758
Exponent	100	95	94	91	110

Source: Part II, Chapter II

Projected Cargo Flow

	1978/79	1979/80	1980/81	1981/82	1982/83
Total Cargo Volume (10^3 K/T)	12,482	13,260	14,092	14,987	15,950
Exponent	117	124	132	140	149

Source: Part II, Chapter II

Cargo Volume by Pakistan Flag

	1973/74	1974/75	1975/76	1976/77	1977/78
Cargo Volume (10^3K/T)	1,123	729	1,074	1,200	913
Exponent	100	65	96	107	81

Source: Part II, Chapter II

Cargo Volume lifted by NSC on 3 Main Routes

	1972/73	1973/74	1974/75	1975/76	1976/77
Cargo Volume (10^3R/T)	610	800	828	806	793
Exponent	100	131	136	132	130

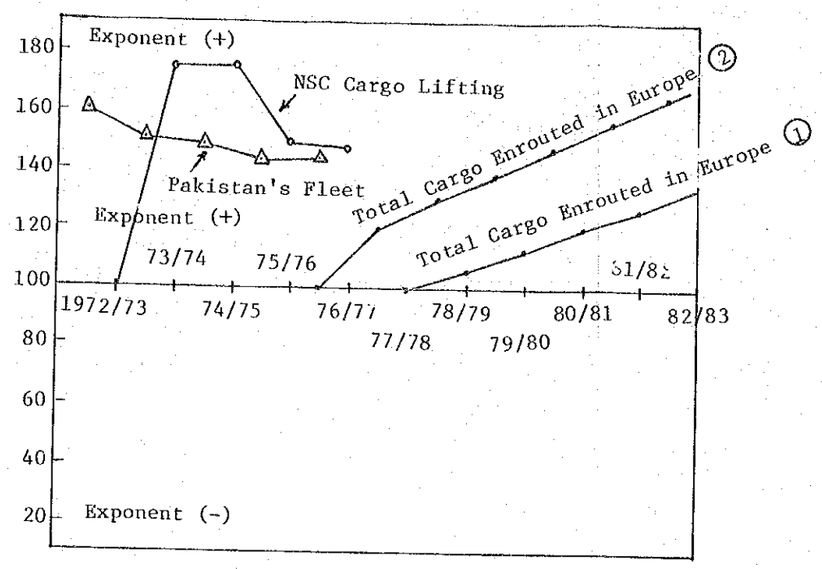
Source: Part II, Chapter III

Pakistan's Fleet

	1972	1973	1974	1975	1976
Fleet Tonnage (G/T)	533	503	497	479	483
Exponent	160	151	149	144	145

(Unit 10^3 Gross Tonnage) Source: Statistical Year Book of United Nation 1976.

CHART 22 (2) INDEX COMPARISON FOR CARGO ENROUTED TO EUROPE AND NSC CARGO LIFTING



Total Cargo enrouted in Europe (Projected ①)

	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83
Cargo Volume(10^3K/T)	2,469	2,621	2,782	2,954	3,137	3,331
Exponent	100	106	113	120	127	135

Source: Part II, Chapter II

Total Cargo enrouted in Europe (Projected ②)

	1976	1977	1978	1979	1980	1981	1982
Cargo Volume(10^3K/T)	3,283	3,951	4,260	4,546	4,837	5,128	5,420
Exponent	100	120	130	138	147	156	165

Source: Part II, Chapter I

Cargo Volume lifted by NSC on U.K./Continent Route

	1972/73	1973/74	1974/75	1975/76	1976/77
Cargo Volume(10^3R/T)	185	325	325	278	272
Exponent	100	176	176	150	147

Source: Part II, Chapter III

Cargo Volume
Exponent

Cargo Volume
Exponent

Cargo Volume
Exponent

EUROPE

ope ②

n Europe ①

82/83

①)

82/83
,331
135

er II

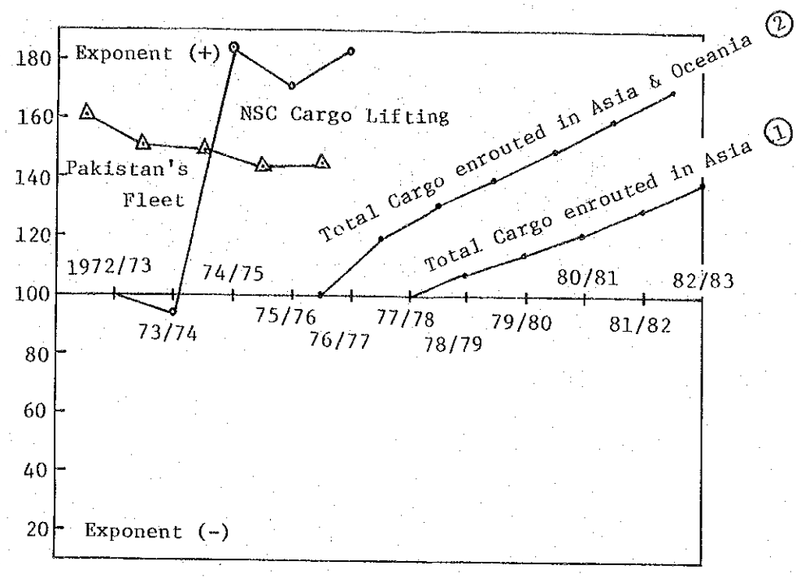
②)

981	1982
128	5,420
156	165

II, Chapter I

oute

CHART 22 (3)
INDEX COMPARISON FOR CARGO ENROUTED TO ASIA & OCEANIA AND NSC CARGO LIFTING



Total Cargo enrouted in Asia (Projected ①)

	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83
Cargo Volume (10^3 K/T)	2,116	2,256	2,405	2,563	2,732	2,913
Exponent	100	107	114	121	129	138

Source: Part II, Chapter II

Total Cargo enrouted in Asia & Oceania (Projected ②)

	1976	1977	1978	1979	1980	1981	1982
Cargo Volume (10^3 K/T)	2,721	3,249	3,529	3,790	4,056	4,326	4,597
Exponent	100	119	130	139	149	159	169

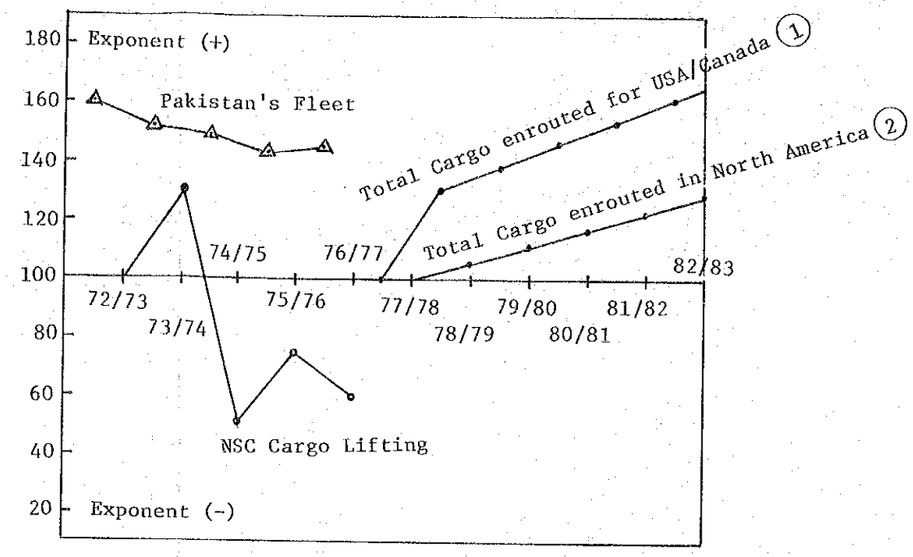
Source: Part II, Chapter I

Cargo Volume lifted by NSC on Far East Route

	1972/73	1973/74	1974/75	1975/76	1976/77
Cargo Volume (10^3 R/T)	215	200	395	370	393
Exponent	100	93	184	172	183

Source: Part II, Chapter III

CHART 22 (4)
INDEX COMPARISON FOR CARGO ENROUTED TO USA/CANADA AND NSC CARGO LIFTING



Total Cargo enrouted in North America (Projected ①)

	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83
Cargo Volume (10^3K/T)	823	866	911	958	1,008	1,060
Exponent	100	105	111	116	122	129

Source: Part II, Chapter II

Total Cargo enrouted in America (Projected ②)

	1976	1977	1978	1979	1980	1981	1982
Cargo Volume (10^3 K/T)	1,517	1,838	1,969	2,089	2,209	2,329	2,449
Exponent	100	121	130	138	146	154	161

Source: Part II, Chapter I

Cargo Volume lifted by NSC on USA/Canada Route

	1972/73	1973/74	1974/75	1975/76	1976/77
Cargo Volume (10^3 R/T)	210	275	108	158	128
Exponent	100	131	51	75	61

Source: Part II, Chapter III

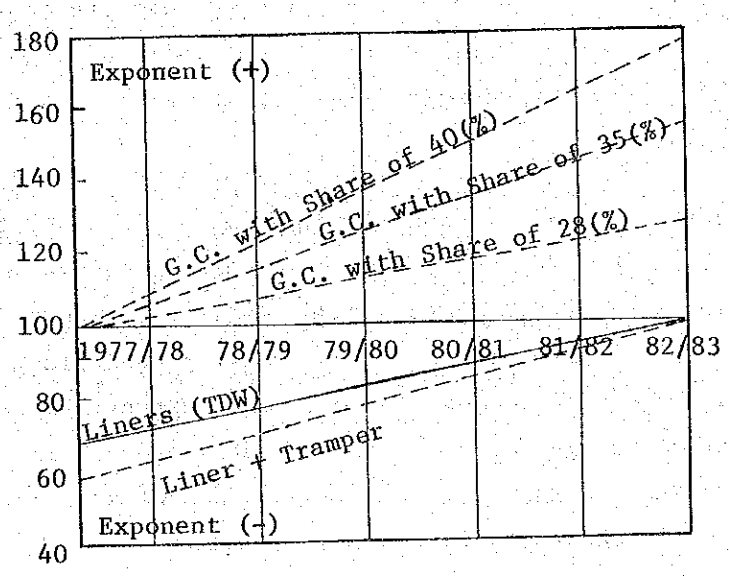
Chart 22(5) Index Comparison for General Cargo Volume by Pakistan Flag and Fleet Capacity by Fifth Five Year Plan

(1) Fleet Composition in 1983

Type	Age	No.	TDW	Disposition
Dry Cargo	0 - 15	25	375,000	Liner
Vessel	16 - 19	16	200,000	Tramp
Total		41	575,000	

From Fifth Five Year Plan

(2) Index Comparison for General Cargo Volume by Pakistan Flag and Fleet Capacity by Fifth Five Year Plan



III. REPLACEMENT OF VESSELS

Preceding Chapter II clarified an outline of the new vessels so far required in the needs/fills correlation from the viewpoints of (1) ship cargo including its movement and trade shares and (2) the type and the size of the fleet together with its trading routes.

This Chapter III will clarify in more detail how the number and the types/sizes of required vessels have been induced and will present the replacement program in a concrete way. (For detailed data and analysis, see PART II, Chapters III-2 and III-3.)

1. QUALITATIVE STUDY

The qualitative study means what types of vessels shall be selected in view of (1) cargo movement and kinds of cargoes and (2) trading routes and collection of cargoes.

1-1 Types of Vessels

The types of the vessels to be studied here are confined to (1) general cargo vessels and (2) specialized cargo vessels such as full container vessels, liquid bulk carriers and dry bulk carriers.

In today's world shipping field, as is well known, full-container vessels have been taking over conventional general cargo vessels. However, the result of this study does not agree to the arguement that the procurement of full-container vessels instead of conventional ones will be able to cover the current trade pattern and seaborne transportation needs and future to contribute to the development of the national economy and industries in Pakistan, because of the following reasons:

(1) Lopsided tendency in kinds of cargoes (See Table 21(6).)

(2) Imbalance between export and import volumes
(See Charts/Tables 21(1) and 21(5).)

(3) Undeveloped infrastructure such as ports, roads, and railway facilities to be systematically connected with ocean transport.

Under these circumstances that full-container vessels are not satisfactory to the replacement program, we enter into a comparison between general cargo vessels and specialized cargo vessels. First of all, it is concluded that we can do without laying emphasis on liquid bulk carriers for the time being for such reasons as mentioned in PART II, Chapter III. Then, our comparison will be concentrated on the general cargo vessels and specialized cargo vessels, especially dry bulk carriers. According to this basic premise, a short term forecast based upon an analysis of items (1) and (2) for up to 1983 - 1984 shows that the demand for general cargo vessels will become much higher than that for dry bulk carriers. A cargowise view of this fact concerning kinds of cargoes, cargo movement by trade route is in Tables 21(6) and 21(7).

However, these two Tables indicate that the aptness has not necessarily been verified for giving up the chances of taking dry bulk cargo onboard. In the year 1982/83, the expected proportion of general cargo to dry bulk cargo is 1 to 1.3 on major trading routes such as of U.K./Continent, Asia and U.S.A./Canada.

Considering the above-mentioned proportion of cargoes and an obtainment of the chances for carrying containers, together with a contribution to the establishment of the foundation for the full-containerization in the future, the type of ships for the replacement may probably be multi-purpose general cargo vessels which will be able to carry onboard (1) not-too-much dry bulk

cargo and (2) not-too-much container cargo at the same time and that, (3) able to keep up the weight of general cargo as mentioned in Tables 21(6) and 21(7). In consideration of the current situation at Karachi Port, it seems more important to strengthen the existing fleet of conventional cargo ships for the time being, and to expect more efficient operation of the fleet in the future.

In this connection, with the above (1) and (2), the study has also to consider, with respect to the ability of shipypards in Pakistan, if they can build this type of vessels. Since such a judgement is dependent also on the number and the sizes of vessels, an over-all consideration shall be required.

As far as the analysis solely based on the type of vessels is concerned, it proves that the shipyard in Pakistan has enough ability for construction of such a type.

1-2 Sizes of Vessels

As aforesaid, the determination of the ship type shall be based on the cargo movement, the kinds of cargoes, etc. in the past results and in the future predictions. This is also true of the determination of the ship size. The determination of the ship size is conditioned as follows:

(1) The operational results in the past show some examples of leading ships (12,500 ∿ 13,500 TDW) of the existing fleet running full of cargoes in liner service. Therefore, the size of such new vessels shall not be smaller than the existing ones.

(2) According to the present operation, the existing vessels engaged in liner service call at 10 ports or more in one voyage, which means inefficiency in operation. In order

to improve efficiency, it is necessary to decrease the number of ports-of-call in one voyage, down to the level near the normal operational condition of liner routes. Considering the number of voyages in a year, the new vessels' speed shall be 16.0 to 16.5 knots on an average.

(3) Considering the number of voyages in a year, the cargo movement on major trading routes and the collection of cargoes, 15,000 TDW ships will become necessary. For the moment, however, the type of a bit smaller than 15,000 TDW will be good enought for the UK/Continent route, one of the three major routes.

On the basis of the above (1) ∿ (3), the study tentatively took up three sizes, namely, 13,000 TDW, 15,000 TDW and 17,000 TDW as samples and evaluated efficiency in each case, taking into account collectable cargoes in one voyage.

The conclusive model is, referring to the PART II, Capter III-3, 15,000 TDW as the most suitable size.

As in the case with the ship type, the possibility of domestic building of this size has been tried, the answer being fully affirmative with a margin, as shown in Chapter IV-4.

1-3 Summarized Conclusion on Type/Size of Ship

The above Chapter III-1-1 and III-1-2 conclude that the class of 15,000 TDW most modernized multipurposes general cargo vessels are best suited for the replacement program on collateral condition that some of those could be built at a shipyard in Pakistan. Therefore, in studying the number of vessels to be newly built, it is essential to refer how many of those could be built at a shipyard in Pakistan, and what kind of contribution such construction could make to the development of shipbuilding industry in Pakistan.

2. QUANTITATIVE ANALYSIS

The quantitative analysis implies estimations (1) of the number of required ships based upon the demand forecast by region or by main route, (2) of the number necessary for maintaining the highest level of transportation demand in the past results and (3) of the number necessary for keeping up the sailing rights and the assignment frequency in view of orderly relation among international shipping conferences.

The analysis is detailed in PART II, Chapter III-2. The outlined configuration of Pakistan national fleet as of 1978 and detailed breakdown on the basis of ship's age are summarized as follows:

Kind	Age as of 1978	Number	TDW	Route
Dry Cargo	0 ∿ 15	20	260,000	Liner Service
"	16 ∿ 19	10	120,000	Tramp Service
"	More than 20	15	180,000	To be scrapped.
Passenger	17, 18, 27	3	15,000	Pilgrim
Total:		48	575,000	

Source: The Fifth Five Year Plan (1978-1983), Page 125.

Built in	Age	Number	TDW (Average)
1953	25	2	11,700
1955	23	1	11,653
1957	21	3	11,107
1958	20	8	12,109
1959	19	2	12,883
1960	18	3	13,569
1961	17	1	7,037
1963	15	2	14,040
1964	14	1	10,872
1965	13	3	14,352
1966	12	4	12,133
1967	11	2	13,136
1968	10	7	13,034
1970	8	1	13,066
1972	6	3	15,421
1974	3	1	13,421

Remarks: Three passenger cum cargo vessels and one coaster vessel are excluded.

As is clear in the above two Tables, 15 vessels are more than 20 years of age, one fifth of which, or 3 vessels, are more than 23 and 6 vessels, more than 21 respectively. We are not sure that these aged ships can still be useful for liner service, but even so and even if they are engaged in tramp service, they could hardly be paying, we suppose. This is also true of the total 14 vessels of more than 20 years of age as of 1978 when this study was made, and same with 16 vessels which will reach this age in 1979.

The procurement of new vessels for the replacement does not always lead to new building of them and the purchase of second-handed vessels of tender age is probable. However, it is supposed comparatively easy to find second-handed vessels suited for this purpose in the category of general cargo vessels, but not in the category of general cargo vessels for line service. In addition, a purchase of second-handed vessels has following

demerits:

(1) It will not open up any channel to the construction of sister-vessels at a shipyard in Pakistan.

(2) It will not contribute to the industrial development from a macroscopic point of view.

Therefore, for the purpose of this replacement, there is no way but a stepwise scrap-and-build system, not contradictory to the number of vessels which can be built at a shipyard in Pakistan. In this case, it has to take account of the inevitable time lag from the commencement of construction of each ship to its entry into service. Besides this condition, the determination of the minimum number of new vessels should be based on the thorough-inspection results of the existing fleet and on the check results of the possibility of repair on it.

The 16 ships, being considered most appropriate to the replacement in PART II, Chapter III-2, will demonstrate, as shown in Table 31, the capability of the domestic shipbuilding on one hand and materialize the necessary replacement even to the least possible extent, on the other hand.

That is to say, 3 ships (corresponding to more than 23 years of age) will be replaced by the middle of 1980 and 3 more ships (corresponding to more than 21 years of age), by the beginning of 1981, both of which will make 6 ships in total replaced (equal to the total number of more than 21 years of age). In addition, 8 more vessels shall be procured including domestic construction by the middle of 1982 (covering all those more than 20 years old) and 2 vessels shall be built at a shipyard in Pakistan by the end of 1983 (corresponding to more than 19 years of age).

As a matter of course, the core of analysis should not only be placed on the age of ships. There is an obvious trade-off in reality, for instance, the aged ships, which are made eligible

for the replacement within a certain quantitative limit, can hardly go on service and that, the newly built ships are expected to play a vital role, particularly on liner service routes, mainly because of their high profitability based upon the returns from investments.

From another point of view, it is a fact that the inefficiency and low profitability of the aged ships would offset the high efficiency and profitability of the newly built ships.

Such a relation is suggested in the comparison of operating particulars between the new fleet and NSC's ships, and the operational profitability of new ships as of 1980 and 1984 is more clearly explained in Table 32 and 33.

3. SUMMARIZED CONCLUSION ON NUMBER AND TYPE/SIZE OF THE VESSELS

The number of vessels to be built in Pakistan shall be 4 as mentioned in PART II, Chapter IV and also in next Chapter IV titled "KSEW". Our conclusion from the viewpoint of number and type/size of the ships to be based on the commercial profit (Tables 32 and 33) are summarized in the following particulars:

(1) 16 Vessels to be procured for the replacement program

(2) 15,000 TDW Class

(3) 16.0 ∿ 16.5 Knots

(4) Most-modernized multipurposes general cargo vessels suitable for carrying onboard general cargo and dry bulk cargo.

(5) 4 vessels to be built in Pakistan and 12 to be procured abroad.

As previously pointed out, the procurement of these 16 vessels is to be made as early as possible and at the most adequate time, which implies by no means a synonym for a procurement of all the

ships at the same time, nor for a continuous procurement with equal intervals between one thing and another throughout the whole period.

The study of the past and future trend of transportation volume and the same of vested rights of shipping company from the view point of an orderly relation in shipping industry are both based on a common foundation governed by the trend of the international economy and no one can exactly foresee in what direction the international market and economy would develop.

In this respect, it may well be said that the operational profitability on tramper routes, although handicapped by the age of ship which is a selective criterion for a scrap-and-build system, should similarly be considered.

Extremely speaking, the liner routes cannot always be profitable, nor unprofitable are the tramper routes in all cases.

It is a pity that the world economy shows no symptoms of quick recovery in the near future. In our unavoidable acceptance of this gloomy situation, the ship replacement program in Table 31 might well be so modified that the procurement of the required ships should partly be reserved. This is another fact to be duly understood. Fulfillment of the quantitative requirements, however inevitable it may be, does not imply the whole accomplishment at the same time.

For reference sake, average values of operational profits of newly built ships for 20 years following their entry into service, as calculated by their main routes, are shown in Table 33, which suggests a possibility of considerable variety in their respective net profits by allocation of newly built vessels.

Leading Particulars of 15,000 TDW Multi-purpose General Cargo Ship

Type of Ship	:	Multi-purpose General Cargo Ship
Kind of Cargoes	:	General Cargoes Containers (Incl. Ref. Containers) Bulky Cargoes

Outline Particulars

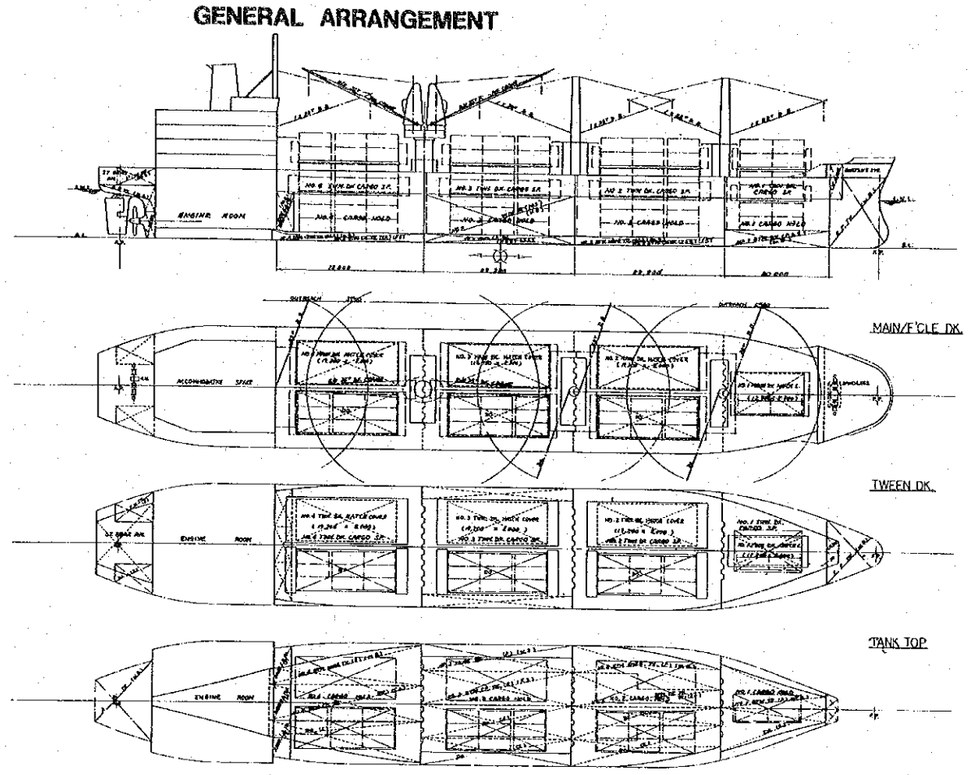
Class	:	LR + 100A1 + LMC or NK NS * MNS*
Rules & Regulations	:	SOLAS 1960 & 1974 ILLC 1966 SUEZ CANAL PANAMA CANAL ST. LAWRANCE SEAWAY

Principal Dimensions	:	Lo.a.	abt. 153 M
		Lb.p.	145.00 M
		B mld.	23.00 M
		D mld.	13.40 M
		d mld. designed	9.00 M
		d mld. scantling ...	9.65 M

Gross Tannage	:	abt. 13,000 T
Deadweight	:	abt. 15,000 L/T on the designed draft (15,240 K/T) abt. 17,000 K/T on the scantling draft

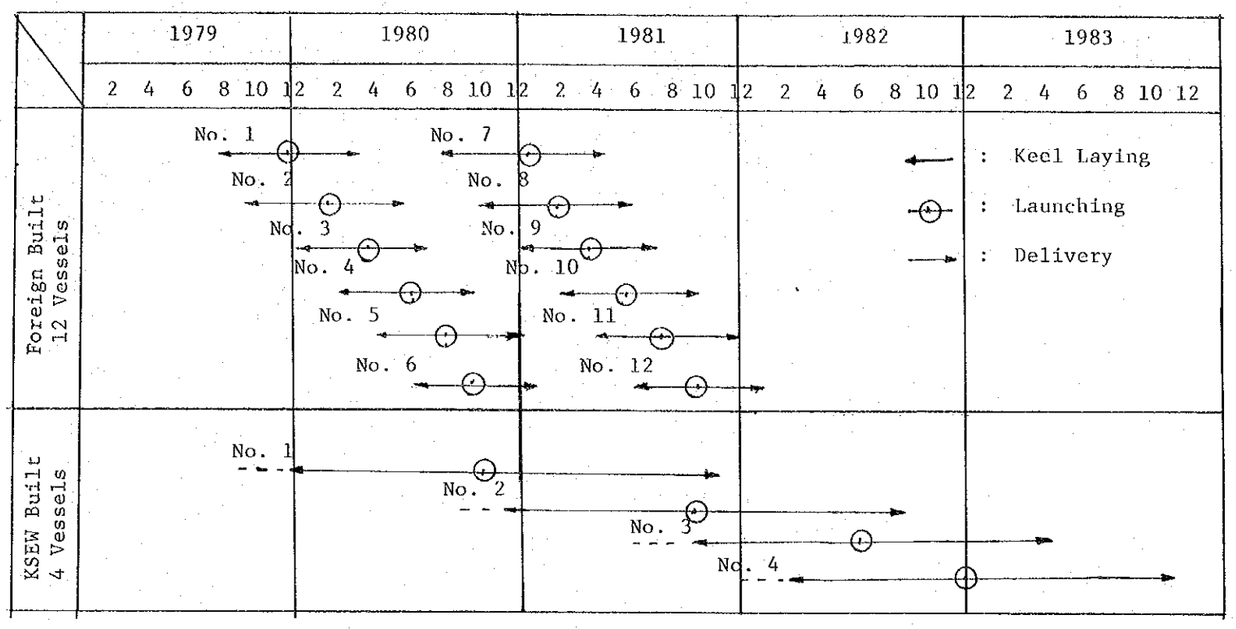
Capacity	:	Cargo Holds	abt. 23,800M³(Grain)
			abt. 21,500M³(Bale)
		No. of Containers ..	abt. 390 TEU (incl. 10 TEU Ref. Containers)
		Fuel Oil Tanks	abt. 1,500M³
		Fresh Water Tanks ..	abt. 300M³
		Exc. Water Ballast Tanks	abt. 3,000M³

GENERAL ARRANGEMENT



Main Engine	:	Slow-speed Long-stroke Type Diesel Engine x 1 Set Max. Continous Output ... abt. 11,200 ps (BHP) x 119 rpm Normal Output ..... abt. 9,540 ps (BHP) x 113 rpm
Service Speed	:	abt. 16.5 Knots (On the designed draft at Normal Output of Main Engine with 20% sea margin.)
Endurance	:	abt. 15,000 Nautical Miles
Complement	:	40 Persons
Cargo Handling Gears	:	22T SWL E/H Driven, Single-boom Derrick Crane x 5 Set 50T SWL E/H Driven, Twin Deck Crane x 1 Set (2 x 25T SWL)

TABLE 31 SCHEDULE OF SHIPBUILDINGS



Cost of the Ship to be built

(Unit: US$X1,000)

Nos. of Ships	16
Building Cost	224,000
Consulting Fee	2,201
Total	226,201

Remarks:

1. Building Cost: 14 Mil. Dollars per ship.
2. Although the actual shipbuildig cost at KSEW is higher than 14 million dollars, they are subsidised the excess cost of up to 30% of the total building cost. Therefore, both of the building cost at foreign shipyard are at KSEW are assumed same.
3. Shipbuilding cost comprises the building cost and consulting fee.

Ship Delivery, Route Assignment, Fund Allocation/Payment Schedule

				1979	1980	1981	1982	1983	Total
Ship Delivery Schedule & Route Assignment	Delivery Schedule	Foreign Built		-	5	6	1	-	12
		KSEW Built		-	-	1	1	2	4
		Total		0	5	7	2	2	16
	Route Assignment Idea (1)	UK/Continent		-	2	2	2	1*	6
		Asia		-	2	2	1*	1*	6
		USA/Canada		-	1	3*	-	-	4
	Route Assignment Idea (2)	UK/Continent		-	2	3	1	2	8
		Asia		-	2	2	1	-	5
		UK/Continent		-	1	2	-	-	3
Fund Allocation/ Payment Schedule	Shipbuilding	Order	For./KSEW	12/4	-	-	-	-	12/4
		Keel Lay	For./KSEW	3/-	6/2	3/1	-/1	-/-	12/4
		Launch'g	For./KSEW	1/-	6/1	5/1	-/1	-/1	12/4
		Delivery	For./KSEW	-/-	5/-	6/1	1/1	-/2	12/4
		Total (Monad)	For./KSEW	16/4	17/3	14/3	1/3	0/3	48/16
			Total	20	20	17	4	3	64
		Build. Cost	For./KDEW	56,000/14,000	59,500/10,500	49,000/10,500	3,500/10,500	0/10,500	168,000/56,000
			Total	70,000	70,000	59,500	14,000	10,500	224,000
	Consulting Fee			605.5	1,002	593.5	0	0	2,201
	Total Building Cost			70,605.5	71,002	60,093.5	14,000	10,500	226,201

Remarks

1. * Mark: One Ship (1) Built at KSEW.
2. Delivery schedule is based on IV-2-4-2.
3. Assignment Schedule is based on III-3-1-1.

1. Payment terms of Shipbuildings at time of -

   order placing: 25%(3.5 Mil US$)
   Keel Lay : 25%(")
   launching : 25%(")
   delivery : 25%(")
2. Payment terms of consulting fee is based on IV-5.
3. Unit Italic number Monad. 1 Monad = US$3.5 Mil.
4. For. means foreign shipyard.

Table 32 Operational Earning of the Newly Built Ships

Operational earnings per vessel of the newly built ship which is assigned to three (3) service routes are calculated below:

Item	Service Route		
	UK/Conti.	Asia	USA/Canada
Average Cargo Liftins per Voyage (R/Ton)	21,463	23,568	16,463
Average Numbers of Voyage/ Year	3.34	3.28	3.32
Average Cargo Liftins/Year (R/Ton)	71,631	77,339	54,862
Average Freight Rate ($)	78	40	100
Average Freight Revenue/ Year ($)	5,595,400	3,098,478	5,496,180
Average Operational Expense/ Year ($)	3,185,800	2,698,290	3,612,500
Average Administration Expense/Year ($)	131,000	131,000	131,000
Average Total Expense/Year ($)	3,316,800	2,829,290	3,743,500
Average Net Earnings/Year ($)	2,277,350	269,188	1,732,680

Table 33 Trial Calculations of Freight Incomes

1. Route Assignment, Idea (1)

Unit (US $ 1,000)

Year	No. of New Build.	Route Assignment			Freight Incomes				
		UK/Cont.	Asia	USA/ Canada	UK/ Conti.	Asia	USA/ Canada	Total	Mean per Vessel
1978	-	-	-	-					
1979	-	-	-	-					
1980	5	2	2	1	11,191	6,197	5,476	22,884	4,577
1981	7(12)	2 (4)	2 (4)	3 (4)	22,382	12,394	21,905	55,680	4,640
1982	2(14)	1 (5)	1 (5)	0 (4)	27,977	15,492	21,905	65,374	4,670
1983	2(16)	1 (6)	1 (6)	0 (4)	33,572	18,591	21,905	74,068	4,629
1984	(16)	(6)	(6)	(4)					
Total	16	6	6	4				218,007	4,638
Mean for above Four (4) Years:									4,638

Note: (1) No. in ( ) shows total numbers.

(2) Each Freight Income has been calculated with the mean incomes for twenty (20) years duration in each route.

(3) Idea (1) corresponds to Case 2-1 in PART II, Chapter V.

2. Route Assignment, Idea (2)

Unit (US $ 1,000)

Year	No. of New Build.	Route Assignment			Freight Incomes				
		UK/ Conti.	Asia	USA/ Canada	UK/ Conti.	Asia	USA/ Canada	Total	Mean per Vessel
1978	-	-	-	-					
1979	-	-	-	-					
1980	5	2	2	1	11,191	6,197	5,497	22,884	4,577
1981	7(12)	3 (5)	2 (4)	2 (3)	27,977	12,394	16,429	56,000	4,733
1982	2(14)	1 (6)	1 (5)	0 (3)	33,572	15,493	16,429	65,494	4,578
1983	2(16)	2 (8)	0 (5)	0 (3)	44,763	15,493	16,429	76,684	4,793
1984	(16)	0 (8)	(5)	(3)					
Total	16	8						221,861	4,721

Note: Idea (2) corresponds to Case 2-2 in PART II, Chapter V.

Comparison of freight incomes of both assignment ideas shows us the superiority of idea (2) in the points of total income as well as in mean income per vessel.

IV KARACHI SHIPYARD & ENGINEERING WORKS (KSEW)

In the afore-said paragraphs as to the outline of planning and the replacements, what vital role KSEW plays in the shipping development is made clear. Henceforward, the study condenses programs from the point of view of shipbuilding and/or shipyard. The program might be able to approach from 3 practical points of view as follows:

(1) Quantitatively, for the time being (more precisely, for coming 3 years and 9 months), it should be aimed at to build 4 most modernized cargo vessels of 15,000 TDW class by the system of sister ship construction of an identical design to the ships procured from abroad.

(2) Technically and managerially, it should be seeked to attain the level of potentiality in technique and in management which are pertinent to the above building program and at the same time, eligible for a contribution to an overall up-grading of KSEW in the future.

(3) Financially, it should be expected to consolidate the financial structure of KSEW which has been dependent on governmental subsidies for construction of ocean going vessels into the one which can afford to do without these aids.

This paragraph would, therefore, show an analytical description of KSEW's capability in line with the above 3 approach channels and points and items of discussion would be clarified in conjunction with collateral conditions, if any.

1. Production Capacity

The comparative figures for production capacity of KSEW at the initial stage of its establishment assisted by H. C. Stulken Sohn, West Germany, and at the present stage and another comparison of production capacity/actual achievement with a Japanese shipyard which is similarly dimensioned in scale of production and facilities are shown in Table 41.

The figures for major factors are referred to as follows:

Factors	Production Capacity: Initially Expected KSEW's	KSEW's Figure	Japan's Reference
Steel Ton (Annual)	10,700	3,600	48,000
Steel Ton (per Head)	5.4	1.8	36.9
Productivity (M.H./Ton)	270	550	60
Working HR (per Day)	4.9	3.3	7.4
Berth Period (Based on 15,000 TDW)	12 Months	14 Months	2.5 Months

Remarks: Calculations are based on average working days of 300 days/year. Factors marked with (#) are calculated on the basis of 2,000 workers required and standard productivity of 270 M.H. Ton.

As the excerpted figures from Table 41 indicate KSEW's capability stands far below not only from the level of the Japanese one but also from KSEW's initial expectation. The reduction in tonnage output is not only the result of poor productivity - which undoubtedly requires improvement - but also of the fact that the KSEW has in the last few years been building smaller ships where the total tonnage per vessel is bound to be less.
This analysis and a tentative improvement guide will be given Chapter IV in PART II. This problem will be approached against the work load likely to come up KSEW on (1) berth basis and on (2) shop basis, both of which are indicated as follows:

(1) Berth Basis

Annual Production Volume (TDW/Year)	38,856 at a maximum 25.573 at a minimum
Production Capacity (Steel Ton per Annum)	11,657 at a maximum 7,672 at a minimum

Remarks: Model-Formula is

$$\text{Annual Production} = Bi \times Ni \times \frac{Ei}{100} \times Pi$$

of which Bi : Size of Berth (Nominal Capacity)
Ni : Number of Berths
Ei : Occupancy Ratio of Berth
Pi : Turnover Ratio of Berth

(Details refer to 2nd Issue, Chapter IV, Table IV-4.)

(2) Shop Basis

Shop Capacity (Steel Ton/Year) 7,741

Remarks: Model-formula is

$$\text{Shop Capacity } QK = Qj \times \frac{Ak}{Aj} \times \frac{Bk}{Bj} \times \frac{Ci}{Ck}$$

$$\frac{Qk}{Qj} \quad \frac{Ak}{Aj} \times \frac{Bk}{Bj} \times \frac{Cj}{Ck}$$

of which Q : Shop Capacity
A : Working Space
B : Number of Workers
C : Working Efficiency
k : Suffix on Pakistan
j : Suffix on Japan

The above figures testify a certain possibility of processing some 12,000 Steel Tons/Year at KSEW by the end of 1983. These figures obviously indicate, as is endorsed by Table 41, 42 and 43 an enough capability for building 4 new vessels. The figures also indicate that the construction period is 20 months (9 months on building berth plus 11 months alongside quay) for 15,000 TDW class. This means a reduction of 3 months from 23 months (11 months on building berth plus 12 months alongside quay) under existing conditions.

2. Technical and Functional Abilities

A physical and numerical quantitative analysis of production capacity would, as an index of KSEW's overall productivity including technical and managerial aspects, show a possibility of performing 472 M.H./Ton at a maximum and 426 at minimum, up graded from the existing 550 M.H./Ton. This possibility would, in consideration of the projected building of 4 vessels of 15,000 TDW class, be led

to the final decision of its productivity at 450 M.H./Ton to be aimed at for the time being.

The target of 450 M.H/Ton is fully attainable as is shown in Table 43, and at the same time it represents a sufficient technical and managerial level for building of 10 bulk carriers of 4,000 TDW already contracted (final delivery in March 1983 at the latest) together with simultaneous construction of barges and other miscellaneous ships. (cf. Table 42). Various factors and/or conditions necessary for materializing this possibility will be discussed in detail in Chapters IV-2-2 to IV-2-4 in PART II. These can be condensed into 10 points, as enumerated hereunder.

Internal Factors:

(1) Partial reinforcement of facilities. (Example: Welding machine, etc.)

(2) Elimination of various bottle-necks attributable to the arrangement of installation/equipment or to these application. (Example: Flame-plainer, etc.)

(3) Improvement of working efficiency. (Example: Adoption of block-construction method, etc.)

(4) Reinforcement of production control system. (Example: Elimination of idleness, etc.)

(5) Improvement of elemental techniques. (Example: Techniques for straightening, pipe bending, precise-cutting and so forth.)

(6) Improvement of material procurement. (Example: Strict control on issue of drawings, etc.)

(7) Increase of workers and their training. (Projection: Additional requirement of workers is estimated at some 800 till 1982/83.)

(8) Improvement of availability of installation/equipment. (Example: Up-grading of maintenance and inspection.)

External Factors:

(9) Introduction of technical assistance from advanced shipbuilding countries.

(10) Package-import of drawings and materials

On the promise that the above-mentioned relations and conditions are duly understood, the planning on problems governed by the said internal and external factors, separately and jointly, will be briefed hereunder.

On Personnel:

Factor (7) on increase of workers and their training would have to be started and completed in advance of the commencement of 15,000 TDW vessels at KSEW wherein the construction of 4 vessels of this type will be based on sister ship series, relying partly upon a package import of design and materials from abroad, as proposed in Factor (10). Accordingly, the request for technical assistance from advanced shipbuilding countries should also be submitted in good advance and in most adequate time for the same reason.

On Material:

Factor (10) on a package-import of drawings and materials will be extracted wherever necessary to do so. Now that KSEW is not experienced in sister ship construction based upon the prototype of foreign make, it can be said in general that the most convenient and therefore the safest means is a package import of design and all the materials required. In order to get a package import used smoothly and efficiently in new shipbuilding at KSEW but also other parties or organizations concerned should back it up, of course. At the same time, in view of the fact that a digestion of imported design is likely to affect job instructions at the bottom and the management on the top, Factor (10) should be carried out in conjunction with Factors (6), (7) and (9).

For example, it may become inevitable for design engineers to act as instructors in training at KSEW, as soon as the procurement contract is awarded.

So long as the present planning is concerned, it is no better than the original pattern of assembly and knock-down system in auto-industry, and hardly contributable to the national industrialization referred to in the study.

In this connection, a package-import system should temporarily be adopted for the time being, and in long term view, the weight of domestic procurement will naturally be increased, according to an accelerated domestication of materials and equipment and a growth of related industries.

3. Financial Analysis

A basic financial allocation for the projected building of 4 vessels in KSEW is as follows:

Event	1979	1980	1981	1982	1983	Total
Order	4					0
Keel-laying		2	1	1		4
Launching		1	1	1	1	4
Delivery			1	1	2	4
Total (Monard)*	4	3	3	3	3	16
Instalments of Sales Price (US$1,000)	14,000	10,500	10,500	10,500	10,500	56,000

Remarks: Estimate-standard for shipbuilding cost refers to Chapter II-2 in this PART.

* Monard equivalent to U.S.$3.5 million in connection with the terms of payment.

On the basis of the said financial positioning, (1) payment terms (25% payment evenly at each time of contract of order, keel-laying,

launching, and delivery) and (2) necessary fund/allocation for the afore-mentioned grade-up of technical and functional capabilities are comprehensively estimated as follows:

Unit (US$1,000)

Items	1979	1980	1981	1982	1983	Total
Direct						
Building Cost	16,604	12,453	12,453	12,453	12,453	66,416
Facilities for Shops	125	125				250
Indirect						
For Training	250	250				500
Total:	16,979	12,828	12,453	12,453	12,453	67,166

Remarks: 1) Subsidy as may be decided by Government of Pakistan is recommended to be paid to KSEW in 4 instalments, i.e., at -

(a) Signing of contract
(b) Keel laying
(c) Launching
(d) Delivery

So that KSEW does not suffer further loss by way of interest.

2) Respective allocation of foreign fund, expended domestically and abroad for package-import of drawings and materials is omitted since the above cost includes both of them inseparably.

3) An ordinary basis of interest rate should have been taken account but is exempted here in consideration of the facts that NSC (the client) and KSEW (the builder) are both national companies and that KSEW customarily depends upon governmental subsidies under the burden of great losses. This is done for the benefit of shipping circle (NSC) on condition

that interest rates are to be otherwise treated throughout shipping and shipbuilding concern.

The total amount of US$67,166 million means US$13.43 million at the equal per annum which is equivalent to some 50% of total sales of KSEW in the fiscal year of 1975/76. (Refer to Table 403 in PART II) It also indicates an increase in net expenditures by US$6.25 million per annum. On the contrary, an increase in sales together with an expansion of the fixed assets and a promotion of employment as the tangible objects and intangible objects such as productivity improvement, estimated at 5% at a yearly maximum, and reinforcement of management ground and technical foundation are nothing but poor altogether.

In Table 430 in PART II, the production share of shipbuilding sector will account for 31% of KSEW's total in 1975/76 and 80% of the same in 1982/83, on con dition that other sectors stay at the same level of production as at present. This is self-explanatory of what role KSEW plays in the fundamental development plan and how much it contributes to Pakistan's industrialization, directly and indirectly, with its own development.

TABLE 41 : COMPARISON OF KDEW WITH ONE SHIPYARD IN JAPAN

(Shows estimated value.)

Items			KSEW				Record of One Shipyard in Japan
			Original Plan	Actual Record	Analysis/Recommendation		
					Berth Basis	Shop Basis	
Ground Area (M^3)				283,000	283,000		293,500
Machinery Area (M^3)				39,090	39,090		40,680
No.s of Workers (Person)			(2,000)	2,000	2,000		1,300
Building Berth TDW x No.s [Length(M) x Width(M)]			27,000 x 1 (212.8 x 30.5) 15,000 x 1 (168.0 x 23.6) 6,000 x 1 (118.0 x 24.4)	27,000 x 1 (213.8 x 30.5) 15,000 x 1 (168.0 x 23.6) 6,000 x 1 (118.0 x 24.4)	27,000 x 1 (212.8 x 30.5) 15,000 x 1 (168.0 x 23.6) 6,000 x 1 (118.0 x 24.4)		38,000 x 1 (178 x 31.0) 26,000 x 1 (176 x 23.6)
Productivity (Man·Hrs/Ton)			*(270)	550	550		60
Build Amount per Year (TDW)			48,000	12,000	38,900 ∿ 25,000	39,000	212,000
Handling Steel Amount per Year (Tons)			10,700	3,600	7,700 ∿ 11,700	7,750	48,000
Berth Building Duration (Months)	27,000 TDW 15,000 TDW 6,000 TDW		12 for 27,000 TDW BC 12 for 15,000 TDW GC 12 for 6,000 TDW	11 for 13,000 TDW GC	14 for 21,600 TDW BC 11 for 12,000 TDW GC 8 for 4,800 TDW		3 for 27,000 TDW BC 2.5 for 15,000 TDW GC 1.5 for 6,000 TDW
Hull Construction Shop (Main Facilities)	Shop Crane Unit (Total Lift Capacity)	Steel Storage Space & Pre-fabrication Shop Assembling Shop Berth Area		7 (45 Tons) 6 (90 Tons) 4 (140 Tons)	Sufficient		12 (94 Tons) 11 (95 Tons) 5 (182 Tons)
	Cutting Device	Flame Plainer		2.5M(Span)x9M(L)x1 Unit	To be reinforced by replacement.		9M(Span)x36M(L)x1 Unit
	Welding Machine	Manual Semi-Automatic Automatic		220 (400 Amp) 3 (CO_2 & Sigma) 9 (Submerge & Argon)	At present short. To be reinforced.		1,004(500 Amp & 300 Amp) 139 (CO_2 & Gravity System) 15 (Submerge & Ele-Gas)
	Back Gouging	Arc Air Gouging		0 Chipper used.	Gauging to be applied.		27
	Press Machine	Hydraulic Mechanical		2 (300 Tons 500 Tons(Frame-Bender) 2	Sufficient		5 (500 Tons & 300 Tons 100, 50, 30 Tons 0 (Frame-Bender)
Work Method	Material Flow Steel Plate & Section			Uni-flow	To be improved.		Plate and Section, Separate Flow
	Planning of Distortion			Air Cool Means	Method to be improved.		Water Cool Means
	Block Condition at Erection			Plate & Frame, Separate Erection	United blocks of plate and frame to be erected.		Block
	Pipe Bending			Heat Bending (90%)	Cold bending to be applied.		Cold Bending (90%)

TABLE 42 LINE SCHEDULE AND PRODUCTION AMOUNT

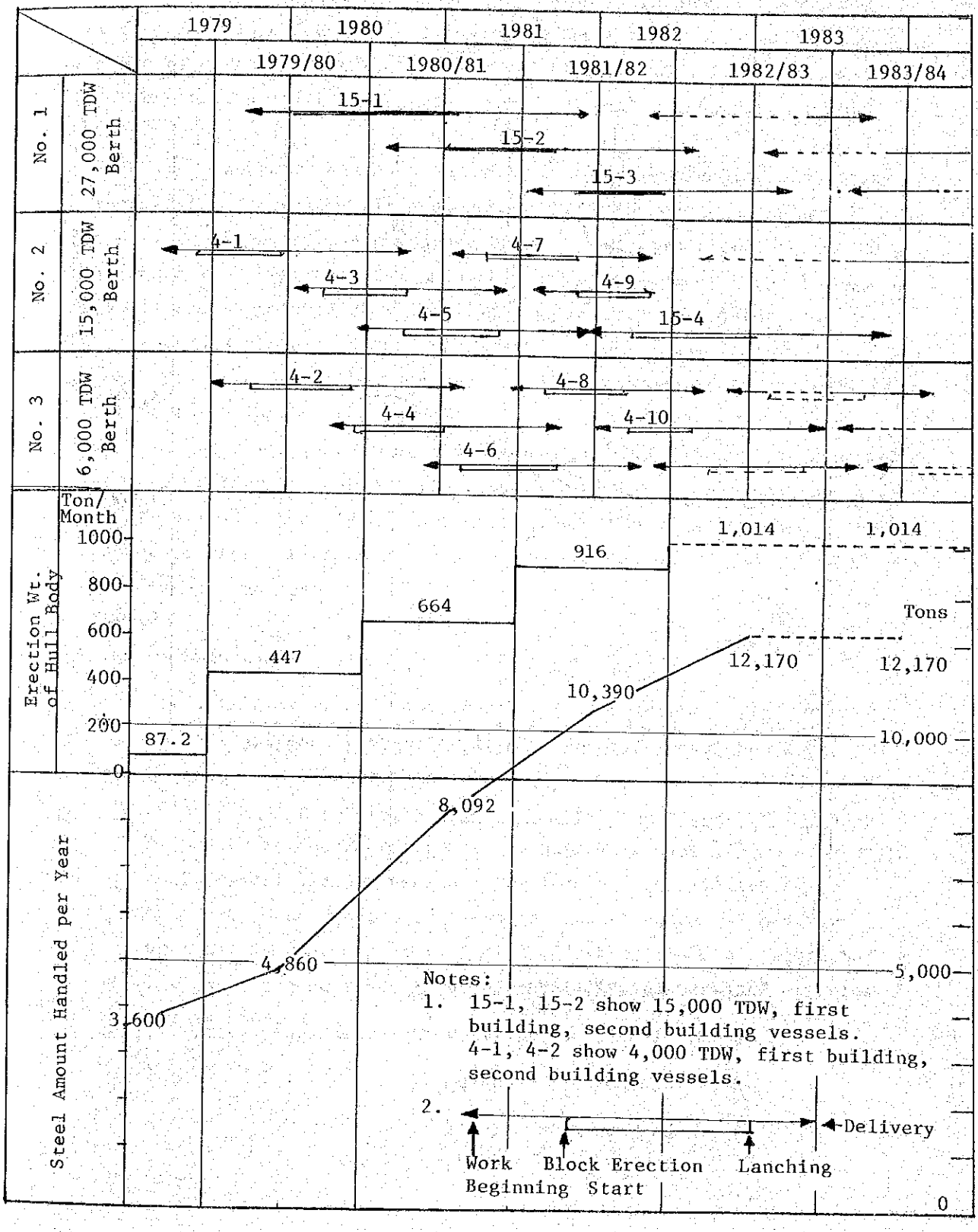
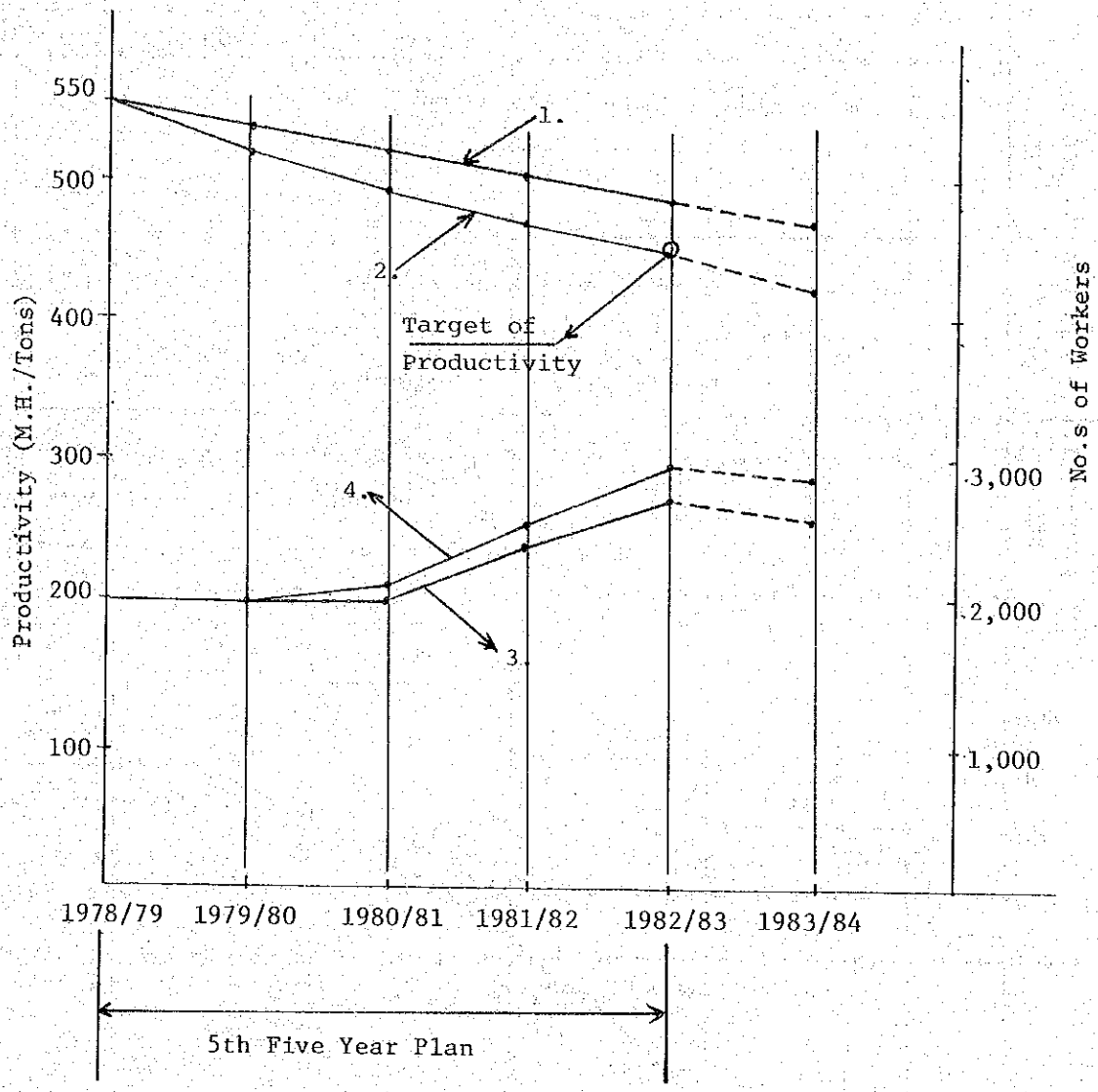


Table 43 Productivity and Labour Force



1 : With 3% productivity improvement per year.

2 : With 5% productivity improvement per year.

3 : Man-power in case of 2 .

4 : Man-power in case of 1 .

V. FINANCIAL REVIEW

The national merchant fleet replacement plan in conjunction with the improvement plan of KSEW was drawn up in Chapter II, III and IV. In order to make financial review of the above plans, it is necessary to take the following basic principles into consideration.

Generally, transport has been described as an all-pervading industry, since it penetrate into all phases of production and distribution of goods with strong inter-dependence between development of transport and the industrial, agricultural and commercial developments, and thus, overall socio-economic development of the country. Investment in transport involves the expenditure of important sums of money and this financial expenditure should be reviewed (1) whether it is financially independent - whether the subject investment could earn revenue sufficient to cover its investment cost and operational expenses, including interest charges and depreciation, and bring about enough returns, and (2) whether it would yield substantial contribution to national economy because it should be considered within the framework of overall economic development planning.

1. On Shipping

The total investment cost of the fleet replacement plan amounts to US$226.201 million, comprising the building cost of US$224.000 million, based on the international price per ship at US$14.000 million from a foreign shipyard and the same price for the ship from KSEW in consideration of government subsidy allowed for excess building cost, and consultant fee for US$?.201 million. The approach to the review of financial independency on this investment was made by application of the internal rate of return method having time consideration under the following basis of calculation and assumptions.

(1) Fund Allocation:

Unit (US$1,000)

Year	Cost Price: Foreign Yard	KSEW	Total	Consul. Fee	Total Cost
1979	56,000	14,000	70,000	605.5	70,605.5
1980	59,500	10,500	70,000	1,002.0	71,002.0
1981	49,000	10,500	59,500	593.5	60,093.5
1982	3,500	10,500	14,000	0	14,000.0
1983	0	10,500	10,500	0	10,500.0
Total:	168,000	56,000	224,000	2,201.0	226,201.0

(2) Payment Terms:

1) 25% of building cost is to be paid each at time of order placing, keel laying, launching and delivery, respectively.

2) Payment of consultant fee is to be paid based on the payment schedule specified in Chapter III in PART II.

(3) Rate of Interest and Repayment Period:

30% of the total fund needed for this investment raised by loan at 10.5% rate of interest with 7 year repayment period and the rest of 70% at 8.5% rate of interest with 7 year repayment period.

(4) Delivery Schedule and Service Route Allocation:

Year	Delivery Schedule: Foreign Yard	KSEW	Total	Route Allocation: UK/Conti.	Asia	USA/Canada
1979	0	0	0	0	0	0
1980	5	0	5	2	2	1
1981	6	1	7	3	2	2*
1982	1	1	2	1	1*	0
1983	0	2	2	2**	0	0
Total:	12	4	16	8	5	3

Remarks: Mark * means one ship built at KSEW included in the figure.

(5) Operational Earnings:

There is a time lag between investment period (during ship building) and operational period when the ships yield earnings. The operational earnings of 16 vessels allocated to three major routes in accordance with above service route allocation schedule for the operational life of 20 years were calculated on the basis of projected annual revenue, and operating and administrative expenses as per Tables III-10, III-11 and III-12 in PART II and the summary of the calculation result were noted in Chapter II of this PART.

(6) Result of Review:

The result of calculation to obtain the internal rate of return, based on above basis and assumptions in which 16 newly-built cargo vessels are operating for 20 years were shown in Chart 53 in this Chapter, Table V-1-1 ∿ V-8-3 and explained in V-1-2 in PART II. This result reveals that the internal rate of return of this fleet replacement plan is 7.8% in case of no price increase and 20.1 percent in case of 8% price increase, which indicates that this investment is considered to be fairly financially independent and can be said feasible, although it is not highly profitable.

Also, the result shows that initial investment can be recovered in 13.8 years in case of no price increase and 10.4 years in case of 8% price increase, and the accumulated maximum deficit reached US$152.329 million in 0% price increase and US$121.118 million in 8% price increase in both 7th year after start of shipping operations. In comparison with the general standard of average period of investment recovery for shipping industry for 10 to 15 years and the highest cumulative deficit not to exceed the investment capital, this plan is also said to be financially acceptable.

The following Chart and Table shown the above results.

Chart 53 Investment Indicators

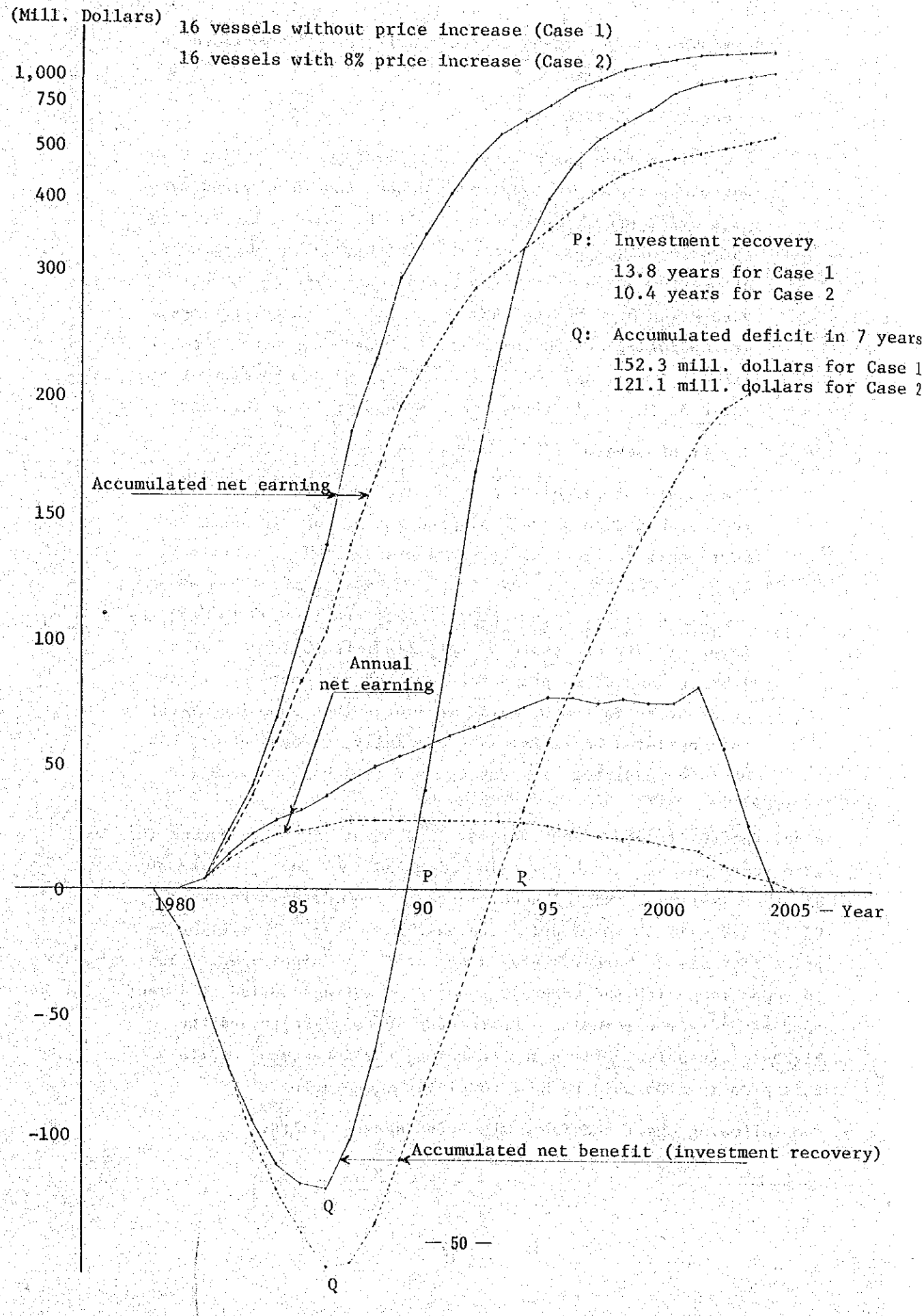


Table 54 Financial Indicators

Financial Indicator	In Case of no Price Increase	In Case of Price Increase
Internal Rate of Return	7.8%	20.1%
Investment Recovery Period	13.8 Years	10.4 Years
Accumulated Maximum Deficit (US$1,000)	152,329 in 7th Years	121,118 in 7th Years

2. On Shipbuilding

The following two points are considered as important policies for the development of KSEW.

(1) Improvement of shipbuilding facilities.

(2) Technical transfer from the advanced countries in shipbuilding industry.

The amounts of the projected investments for the above purposes are as follows.

Investment

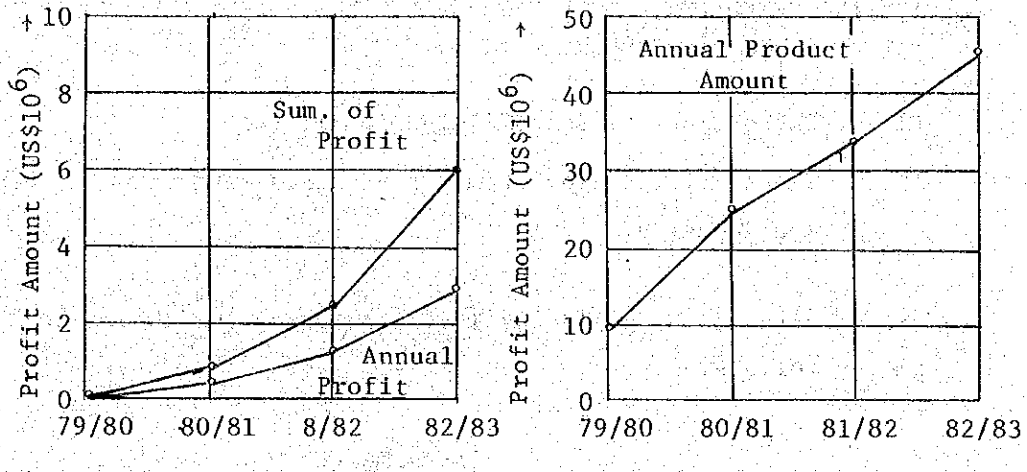
Year	Investment	Purpose	Effect
1979/80	Phisical Object US$250,000	Improvement of Facilities	Deleting of Bottle Neck Up Grading in Qualities
1979/80	Immaterial Object US$500,000	Technical Transfer	Improvement of Productivity Increase of Direct Profit

Build Amount and Profit Increase

Unit (US$10^6)

	1979/80	1980/81	1981/82	1982/83
Buil. Amount	9.76	24.82	33.62	44.76
Profit Increase	0.17	0.85	1.69	3.01
Sum. of Profit	-	1.02	2.71	6.02

New Shipbuilding Amount and Profit Increase



3. Contribution to National Economy

The method of review on the contribution to national ecomony was made on the basis of calculation of the amount of net gain to balance of payment in Pakistan, because its continuous deficit is one of the most crucial issues for her economic development.

The net gain to balance of payment in this fleet replacement plan was derived by figuring out all the gain factors (gross freight revenue by 16 vessels) and the loss factors (repayment of capital, interest, foreign exchange component of operational expenses and foreign receipts foregone) during the operational life of 20 years, and then obtain difference between total gains and total losses. The details of the basis of calculations and the results were shown

in V-2 and Tables V-9-1 to V-9-4 in PART II, and the summary of which are noted below.

(1) The total net gain to balance of payment by 16 new ships is expected to be US$298.4 million for 20 years of operational life of ship.

(2) An average annual contribution to balance of payment scores about US$15 million which accounts for about 2.3 percent contribution to the overall balance of payment when based in 1977/78.

(3) Up to 7th year from start of investment, deficit to balance of payment increases, but will be balanced off in 12.3 years and from then on, this investment is expected to contribute about US$30 million annually.

In addition, execution of this replacement plan is expected to bring about the following basic benefits.

a. Employment:

About 12,765 man/month skilled labour force during 5 years from 1979 to 1983 is expected.

b. Productivity Improvement:

Productivity efficiency is expected to increase by about 5% per annum, and consequently, accumulated profit increases about 6.02 million dollars during the 5th Five Year Plan period.

c. Modern skills and technology will be brought in by the foreign shipbuilding engineers in the fields of production planning, control and design, and steel processing, welding, and assembling and outfittings works which would lead to productivity efficiency improvement.

d. Reinforcement of merchant fleet is expected to improve distribution flows of materials and goods, which will effect on stabilization of wholesale and consumer prices.