THE REPORT

OF

THE COMPREHENSIVE STUDY

FOR SHIPPING & SHIPBUILDING DEVELOPMENT

IN THE ISLAMIC REPUBLIC OF PAKISTAN

JAPAN INTERNATIONAL COOPERATION AGENCY

OCTOBER, 1979

PREFACE

In response to the request of the Government of the Islamic Republic of Pakistan, the Government of Japan decided to take up a survey/study on shipping and ship-building development project of that country and the Japan International Cooperation Agency (JICA) conducted the survey/study.

In accordance with the agreed Scope of Work, JICA despatched to Pakistan a survey/study team in 1978. With the cooperation of Pakistani counterpart, the team conducted a field survey in Pakistan and made further studies and analyses of the survey results at our home office in Tokyo. After discussion on the preliminary report with the authorities concerned in Pakistan, a report on "the Comprehensive Study for Shipping and Ship-building Development in the Islamic Republic of Pakistan" has been formulated and it is now ready for submission.

I hope that the report will be found to be useful for the development of shipping and shipbuilding as well as for the socio-economic development of Pakistan and that will contribute to the promotion of friendly relations between our two countries.

I wish to express my heartfelt appreciation to the Government and officials concerned of Pakistan for their positive cooperation extended to our survey/study team.

October, 1979

Shinsaku Hogen
President
JAPAN INTERNATIONAL COOPERATION AGENCY

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I INTRODUCTION

1. Preamble

This report presents the conclusion of the "Comprehensive Study of Shipping and Shipbuilding Development in the Islamic Republic of Pakistan" (hereinafter referred to as Pakistan) which have been planned out in compliance with Scope of Work compiled in accordance with the verbal note exchanged between the Pakistan and the Japanese governments.

The report contains two (2) development plans up to 1983, one for shipping concentrated in the Pakistan national commercial fleet replacement plan and the other for shipbuilding focussed on the improvement plan for Karachi Shipyard & Engineering Works (KSEW). The analysis and planning works have been conducted on the premise to observe the order of the International Shipping Conferences and aimed at formulation of the sound and practical development plans for the Pakistan shipping and shipbuilding within the framework of this order in the scope dated up to 1983, and therefore, the works in the wider scope over 1983 were confined to the minimum necessity.

For this purpose, the Japanese specialist teams visited Pakistan twice and conducted the fact-finding research and analysis in cooperation with the Pakistan specialist groups, and practised inumerable trial and verifying calculations for the grasp of the present situation and forecasting by application of every available analytical technology as possible including computer simulations. During these work, useful informations and advices were offered by the experts and others who were closely connected with the shipping

and shipbuilding industries in the two countries and from other countries.

The compilation of this report was mainly done in Japan, while the content is the crystal of the enormous joint elaboration of the Pakistan and the Japanese specialists. It is also noted that this report was completed with the cooperations and advices from those indirectly concerned in the two nations and of other countries.

All the data used and analytical work practised for the formulation of the development plans are compiled in the volume, "Data & Analysis".

2. Basic Approach to the Planning

The basic research concept and methodology applied for the planning of Pakistan shipping and shipbuilding developments are described as follows.

(1) Forecasting of the macroscopic economic and industrial development in Pakistan to project the most probable economic growth and related trade volume and its growth rate up to 1983 as the foundation of this planning, by analysis of the economic structure and its development trend, in comparison with the Fifth Five Year Plan.

Industrial development forecast to present a guideline for the development planning of shipbuilding.

Analysis of the international balance of payment and the foreign assistance and cooperation as the input data for financial and economic evaluation of the plan.

(2) Projection of the cargo movement for the next 5 years by microscopic analysis of the cargo movement by export/import, cargo type and area/route, in comparison with the macroscopic forecast of trade volume done in (1) above.

Projection of the Pakistani cargo lifting share for the next 5 years as the quantitative needs for shipping development plan by same analytical method.

(3) Drafting the outline of the ideal national commercial fleet formation to meet the quantitative needs of cargo lifting volumes by analysing the present national fleet by vessel type, by age and by record of operations, in comparison with the Fifth Five Year Plan.

(4) Formulation of the sound and practical development plan up to 1983 for the Pakistani national commercial fleet taking into consideration of the gap between the ideal fleet formation and the present fleet standing, in line with the important policies for shipping set forth in the Fifth Five Year Plan and priority of development, including the suitable type of vessel for replacement.

(5) Formulation of the shipbuilding development plan by analysing the present status and potentiality of KSEW by its facility and equipments, construction capacity, organization/personnel, technological capability and management efficiency, and in consideration of the sister-ship building in connection with the shipping development plan.

The production promotion of KSEW (Karachi Shipyard and Engineering Works) shall be studied about the capabilities coping with the shipbuilding demands brought about by the Shipping Development Plan, to the fullest extent.

Development of shipbuilding industry could be thought as the facilitation motive of the industrialization and modernization of Pakistan. The increase of the trade amount attributable to the above effectuates the steady development of shipping business, which would bring back the enlarged needs for shipbuildings.

The possibility of the formation of these growth circle and the contribution to society such as increase of employment, saving of foreign currency, steady distribution of materials shall be searched from the microscopic view points.

The possibility of the increase of the production and the direct gains of KSEW itself shall be examined from the microscopic view point.

(6) Determination of feasibility of the two development plans by financial and economic evaluations.

II SHIPPING DEVELOPMENT PLAN

1. Econo-Industrial Development

The fundamental of the planning of shipping and shipbuilding development should attribute its foundation to the structure and the development trend of the econo-industry of the country. With this concept, the basic approach was made to identify the characteristics of the Pakistani econo-industrial structure and its development trend by in-depth cross-examination of the data and informations, and based upon such analysis the macroscopic forecast of the econo-industrial development was executed.

This forecast aimed at projection of the most reliable and attainable economic growth of Pakistan together with the major economic indicators, in which the projected trade volume shall be the basis to the microscopic analysis of the sea-borne trade cargo volume as the quantitative needs to the planning on shipping. The industrial development projection shall be the indicator for the planning on shipbuilding, while the projected trends of international balance of payment and the foreign assistance shall be the basis for the financial and economic analysis of this development plannings.

1-1. Characteristics of Econo-Industrial Structure

Pakistan is not favoured with the natural resources, such as mineral and energy which are indespensable for the development of her industry and is based her economy mainly on agriculture which is heavily dependent upon the natural conditions and consequently, she is still in the phase of mono-cultural eco-

nomic structure indicating very unstable development trend in the last 6 years, with an average GDP growth rate of 4.1% fluctuating about 1.4% to 3.7%, with exception of 6.8% recorded in a year before oil crisis. Looking at the sectoral GDPs for the same period, the share of agriculture showed the decrease from 35.5% to 32.2% which was offset somewhat by the increase of the share of tertiary industry from 43.8% to 47.1% and there was no increase of the share of the manufacturing industry. The growth rate flactuated in agriculture between minus 2.1% and 4.5%, in manufacturing industry between minus 1.0% and 9.7% and only the tertiary industry recorded the steady share increase.

The rate of population growth is very high, 3% per annum, which indicates the fact that there are abundant labour force, but short of employment opportunities in this country with the very low per capita income ranging from US$54 to 60 during the past 6 years.

Pakistan is dependent her industrial material, fuels and many other products upon import, which induces the continuous deficit on the trade balance (accumulated trade deficit for the past 6 years: US$5,400 million)

Economic Development Trend for Past 6 Years	Compound Growth Rate	Value at Constant Factor in 1977/78
GNP	5.1%	US$4,510 Million
GDP	4.1%	US$4,270 Million
Population Growth	3.0%	75.62 Million

1-2. Forecast of Economic Development

The projected major economic indicators set forth in the Fifth Five Year Plan are noted as follows, in comparison with those of the past 6 years.

	Fifth Five Year Plan (Growth Rate)	Past 6 years (Growth Rate)
Agriculture	6.0%	2.6%
Manufacturing	10.0	1.9
Construction	8.4	10.8
Trade & Transport	7.7	4.4
Others	4.7	n.a.
GDP	7.0	4.1

1-2-1. Forecasting Method and Assumption

Based upon the various economic indicators and other data for the past 8 years and taking account of the economic structure and its infrastructure, forecasting of the microscopic economic development was practised by application of the System Dynamics Method, which is one of the forecasting methods adopted in the World Model by Rome Club and in the Urban Dynamics Models by the U.S. Department of Interior.

It is generally admitted that the result of the overall domestic economic activities in a country is represented by the scale or growth ratio of GDP, and this result is dependent upon its decisive factor, the scale or the growth rate of investment or consumption.

In this case, growth rates of the gross fixed capital formation (investment growth rates) are applied as the input factors to the computer simulations of the Pakistani economic forecasting model based on System Dynamics method, and three sets of simulations were

practised from 1978 to 1983 and further up to 2006. In simulation-1, 6% growth rate was applied which corresponds to the record of past 6 years, in Simulation-3, 10% growth rate was taken which is shown on the Fifth Five Year Plan and in Simulation-2, 8% rate was put in.

1-2-2. Results and Conclusion

The results of the macroscopic Pakistani economic development forecast with abovementioned three different input factors are summarized as follows.

Unit (Ave. Annual Growth Rate: %)

Eco. Indicators	Sim-1	Sim-2	Sim-3
GDP	3.4	4.6	5.9
Agriculture	0.4	1.2	2.5
Manufacturing	3.6	5.8	8.1
Service	5.4	6.3	7.2
Consumption	3.7	5.1	6.4
Population	3.0	3.0	3.0

By analysing the results of the above economic forecast simulations which was based on the present economic structure and its substructure, the following conclusions are drawn out.

In Simulation-1, with input factor of 6% investment growth rate, it is indicated that no substantial development in the agricultural and industrial sectors is excepted and consequently, reformation of economic structure can not be realized.

In Simulation-3, with input factor of 10% investment growth rate, although 10% of investment growth rate was applied, GDP growth rate shows only 5.9% due to the reason that considerable portion of the investment is to be absorbed for the development of social

and industrial infrastructure which do not directly relate to the actual production. This forecast also indicates that 7.0% of GDP growth rate is to be considered to be a bit optimistic.

Furthermore, in order to maintain the projected 10% investment growth rate, treasury account should greatly depend upon the funds to the international cooperation and assistance. Therefore, Simulation-3 would be considered to be too optimistic.

Judging from the present economic structure and investment capability, the economic forecast in Simulation-2 represented by 4.6% GDP growth rate is most realistic.

1-3 Correlation with Trade Volume

1-3-1 Method

Quantitative analysis and forecast of the macroscopic trade expansion which shall be the basis for the microscopic study to project the ocean cargo movements, were practiced in the same way as in the case of the macroscopic economic development applying the System Dynamics Method with the trade records for the past 8 years as the input data to the Simulation-2.

The forecasting of trade volume in metric tons was conducted for the period of the Fifth Five Year Plan (1977/78-1982/83) and up to the year 2006.

1-3-2 Result

The result of the forecasting of the trade volume are summarized as follows.

Item	Growth Rate	
GDP	4.6%	
Trade Volume	6.5%	
By gross volume		12.2 million metric tons in 1977/78
By cargo type		16.8 million tons in 1982/83
General Cargo	4.4%	
Dry & Liquid Bulk	7.1%	
By area		
Middle East	8.6%	
Asia	6.6	
West Europe	6.8	
East Europe	5.3	
North America	5.2	
Africa	6.3	
Others	7.1	

Correlative coefficients between the growth rate of trade volume and the real growth rate of GDP, in the period of the Fifth Five Year Plan are shown as follows.

Correlation	Coefficient
Trade Volume/GDP	1.39
Volume of General Cargo/GDP	0.955

Although the target of trade volume in the Fifth Five Year Plan was set at 19 million metric tons in 1982/83, the trade volume in the same year based upon the 4.6% GDP growth rate was forecasted as 16.8 million metric tons with the annual growth rate of 6.5%.

2. Analysis of Sea-Borne Cargo Movement

2-1. Total Cargo Movements by Export and Import

The line diagram of cargo movements by export and import at the Port of Karachi characteristically shows that the total cargo movements have been steered mainly by import for these thirty years. The volume of cargo repeatedly fluctuated with the interval of four or five years and after the normalizing period of ten years since the National Independence, the annual growth rate of cargo movement in average for the past twenty years came to about 5%. Taking into account the prospect of macro-economic development, the annual growth rate for five years to come is assumed to be around 6.3% in average.

The projected cargo movements are as follows.

Unit (1,000 K/T)

	1977/78	1982/83	Growth rate
Export	2,840	4,784	11.0%
Import	8,918	11,166	4.6%
Total	11,758	15,950	6.3%

2-2. Cargoes by Type

Cargoes of import and export are divided into such four categories by type, as general cargo, dry bulk, liquid bulk and the cargo (iron ore and coking coal) for Karachi Steel Mill, which is now under construction in full force by Pakistan Government. Analizing the trend of cargo movements in the past, the volumes of those cargo movements for years to come are estimated.

2-2-1. General Cargo

General cargo occupies about 25% of the total cargo movements. The main commodities are steel goods for import and cotton for export. The annual growth rate of cargo movements in average for the past five or nine years fluctuates between 2.2% and 5.8%, depending on the period to be observed. Accordingly the estimated growth rate of 4.4% as indicated in the previous section 1-3 could be hereby adopted as reasonable.

2-2-2. Dry Bulk

Dry bulk occupies about 25% of the total cargo movements. Almost all are composed of wheat and fertilizer for import and rice for export. Analizing the past record of the above mentioned three commodities, the future growth rate could be estimated to be about 11% per annum.

2-2-3. Liquid Bulk

Liquid bulk occupies about 50% of the total cargo movements. Almost all are composed of crude oil for import and petroleum products for import and export. Analizing the past record of the above mentioned two commodities, the future growth rate could be estimated to be about 5% per annum. (The average growth rate of dry bulk and liquid bulk in total amounts to 6.9% per annum, which is very close to the growth rate of 7.1% predicted in the previous section 1-3).

Aggregating all the above, the cargo movements are projected as follows.

Unit (1,000 K/T)

	1977/78	1982/83	Growth Rate
General Cargo	2,987	3,705	4.4%
Dry Bulk	2,571	4,332	11.0%
Liquid Bulk	6,200	7,913	5.0%
Total	11,758	15,950	6.3%

2-2-4. Cargo for Karachi Steel Mill

Karachi Steel Mill which is now being constructed at Port Qasim near Karachi as a project of the Government, is expected to commence the partial production in 1980/81 and to go full swing in 1983/84, according to the Fifth Five Year Plan. If the construction proceeds as planned by the Government, the volume of cargo movement will be as follows.

Unit (1,000 K/T)

Year	Coal	Iron Ore	Manganese	Total
1980/81	539	868	21	1,428
1981/82	971	1,570	31	2,572
1982/83	1,151	2,020	41	3,212
1983/84 onward	1,151	2,030	41	3,222

2-3. Cargo Movements by Area

The total cargo movements by area are estimated as mentioned below, referring to the result of prospect as studied in the previous section 1-3.

Unit (1,000 K/T)

Area	Share	1977/78	1982/83	Growth rate
Middle East	45%	5,291	7,184	6.3%
Asia	18%	2,116	2,913	6.6%
Western Europe	12%	1,411	1,961	6.8%
Eastern Europe	9%	1,058	1,370	5.3%
North America	7%	823	1,060	5.2%
Africa	5%	588	798	6.3%
Others	4%	471	664	7.1%
Total	100%	11,758	15,950	6.3%

Out of the above total cargo movements by area, the carriage of general cargoes by liners on which the first priority is placed in the Fifth Five Year Plan is studied below.

2-4. Cargo Movements by Main Liner Trade Route

Assuming that the three main liner trade routes account for about 85% of the total general cargoes, the cargo movements by trade route are predicted as follows.

Unit (1,000 K/T)

	1977/78	1982/83
European trade	1,143	1,417
Asian trade	1,016	1,260
North American trade	380	472
Other trades	448	556
Total	2,987	3,705

2-5. Trade Share

2-5-1. Actual Lifting

The actual liftings of Pakistani flag vessels in 1977/78 are 380,000 tons for export (trade share 13.4%), 533,000 tons for import (6.1%), aggregating 913,000 tons (7.9%).

The statistics by type of cargoes were unavailable to the trade shares for Pakistani flag vessels. In spite of the above it is hereby assumed that about 810,000 tons of general cargo (trade share 28%) and about 100,000 tons of dry bulk (4%) were lifted.

2-5-2. Estimation of Trade Share

(1) Liners

According to the Fifth Five Year Plan, the target of trade share for the owned vessels is set at 42.6%. In order to achieve this target it is necessary that the annual cargo liftings by the Pakistani Merchant Marine should be increased by 13.6% per year. Furthermore, in order to achieve the trade share of 40% which is the standard as indicated in U.N. Convention on a Code of Conduct for Liner Conferences, the growth rate of 12.2% per annum should be necessitated. Moreover, even if Pakistani flag vessels should be able to lift all volume of the cargo increased (annual growth rate of 4.4%), their trade share would barely come to 41.9% after five years to come. All of these targets of trade share are considered rather high, taking into account of the present canvassing record and ability of Pakistani Merchant Marine. Especially in view of the present canvassing ability of Pakistani Merchant Marine, it is considered excessive to set the trade share of

40%, which is defined in U.N. Convention on a Code of Conduct for Liner Conferences, as the target for five years to come although this target may be recommendable as the long-range target, which should be achieved by making unbroken effort of canvassing from now on. (The enforcement of the cargo reservation law (Own cargo by Own vessels) brings rather disadvantages for the promotion of canvassing of the Pakistani Merchant Marine and is not recommendable, because the adoption of the law is apt to deprive the shippers of their option of shipments and hamper the development of the shipping trade, and moreover, causes retorts of the shipping countries who assert the freedom of the shipping trade.)

Accordingly the realistic target may be 35% which will presumably be attainable as a whole, considering the fact that PNSC has the plan to increase their share by about 1% with their effort of canvassing every year and on top of that taking 40% of the forthcoming increased part of cargo volume (growth rate of 4.4% per annum).

(2) Others

The trade shares for trampers, tankers and specialized carriers for Karachi Steel Mill are studied in the next section together with the development plan of the merchant fleet.

(3) Conclusion

The following is the projected cargo volume and the target of trade share in 1982/83 as compared with the Fifth Five Year Plan. (The trade shares for dry bulk, crude oil and cargo for Steel Mill are studied in the next section.)

Unit (1,000 K/T)

Types of Cargo	Five Year Plan			Outcome of Research		
	Demand	Target	%	Demand	Target	%
General Cargo	4,700	2,000	42.6	3,705	1,297	35
Dry Bulk	3,200	1,000	31.3	4,332	600	14
Liquid Bulk	7,600	Charter	-	7,913	2,700	34
Crude Oil				(3,600)	(2,700)	(75)
Steel Mill Cargo	3,500	Charter	-	3,212	642	20
Total	19,000	3,000	15.8	19,162	5,239	27
				(14,849)	(5,239)	(35)

3. Merchant Fleet to Meet Cargo Movement

3-1. Present Status of National Merchant Fleet

The present fleet composition (age distribution in 1978) is as shown in the following table. All the vessels of the fleet, except 3 passenger-cum-cargo vessels, are general cargo vessels engaged mainly in liner services and the average of their ages is very high, indicating unfabourable configurations.

The operational efficiency of the fleet is very low as can be seen from the annual number of voyages per vessel, namely, 2.0 voyages in UK/Continent service, 2.5 voyages in Asia service and 2.2 voyages in USA/Canada service.

Year of built	Vessels age as of 1978	No. of Vessels	TDW
1974-1968	4 - 10	12	164,000
1967-1964	11 - 14	10	128,700
1963-1953	15 - 25	22	266,800
Total		44	559,500

Remarks: Passenger vessels and a coastal vessel excluded.

3-2. Required Tonnage to Cope with Transportation Demand

The existing tonnages, carrying capacity on the basis of existing fleet scale and the operational efficiency are compared with the predicted demands for the transportation in 1982/83. In order to maintain the present trade share of Pakistani fleet (28% of general cargo), the bottoms for general cargoes would be short by 232,000 TDW in 1982/83.

In addition to the above, the specialized cargo vessels such as tankers, bulk carriers etc. should be acquired as necessary to compensate the gaps of the supply and demand.

3-3. Fleet Modernization Plan

3-3-1. Basic Strategy

In the Fifth Five Year Plan, the top priority is

placed on the modernization of general cargo vessels for regular liner and/or tramp services, while bulk carriers and tankers would preferably be kept at present situation by charterings of foreign vessels, although continuous and careful watches into the respective market situation of international freight, chartering fee and vessel prices, are recommendable. However, from the view point of dispersion of trade risks, diversification of operations into wider service ranges and securing of the national minimum requirement are fundamental, and the creation of the well-balanced national fleet, meeting these requirements, would be advantageous and recommendable. The launching into the field of tankers and bulk carriers, in addition to the liner services, could be advised when the efficient second hand vessels of these types are obtainable.

With regard to the procurement of the new general cargo vessels which is the focus of this development plan, taking account of the industrialization policy set forth by the Fifth Five Year Plan, domestic construction of the said vessels at the national shipyard shall be actualized as much as possible.

3-3-2. General Cargo Vessel in Liner Service

Out of 44 vessels, which consist of main part of the national fleet, 32 vessels would exceeds 15 years in their ages in 1982/83. Out of the remaining 12 vessels, 4 vessels, which are difficult for using as liner vessels because of heavy deteriorations, should be dropped out in addition to the above and 36 vessels in total from the liner fleet would be replaced by newly built ones.

In order to maintain the existing 3 main liner services and to carry the aimed share (trade share

of 35%) of Pakistani maritime cargo efficiently by the national fleet, keeping the pace with the predicted increase of cargo volume, acquiring of 16 newly built vessels (15,000 TDW class multi-purpose general cargo vessel - vessel's type and particulars to be referred to 3-3-4 in this Section) would become necessary on the assumption that the 8 + 4 existing vessels which are below 15 years of ages and of good quality can continuously be used. The fleet lined up in this way would satisfy the demand corresponding to the target of the trade share of 40%, with the efforts in collection of cargoes, as sufficient space margin is taken into account, provided improvements envisaged in the performance of Karachi Port are achieved. If they are not materialized, the requirement of additional ships would be higher for achieving the required share of cargo and economics of operating the ships would be adversely affected.

3-3-3. Other Type of Vessels

(1) Trampers

According to the Fifth Five Year Plan, the dry bulk cargo of 1 million tons, except that for steel mill, is planned to be carried by the existing 16 old vessels dropped out from the liner services.

The strategy like this would be useful in keeping the well balanced national fleet and it will be not so difficult to carry about 600,000 tons by these 10 vessels (abt. 128,700 TDW) subject to the required streamlining of their operations.

(2) Tankers

According to the Fifth Five Year Plan, the transportation of the petroleum entirely dependent upon the chartered vessels at present is proposed,

postponing the set up of the national tanker fleet (with two 70,000/75,000 TDW class tankers, total 140,000/150,000 TDW, aimed carrying share of 55.7%) to the next Five Year Plan.

In view of the cargo transportations which are indespensable for the growth of Pakistani national economy, switching the substantial portion of its transportation by their own vessels, at the earliest opportunity when the efficient second hand tankers can be procured, would be desirable and contributable to the formulation of the well-balanced national fleet.

(3) Bulk Carriers for Karachi Steel Mill

It is proposed in the Fifth Five Year Plan to meet the ore and coal transportation demand for Karachi Steel Mill through transportation by chartered vessels, by the time when 75,000 TDW vessels can be accommodated at Port Qasim, in 1983/84, and after that a permanent national fleet for these cargoes (with five 70,000 TDW bulk carriers, total 350,000 TDW, aimed carrying share, that is, trade share of 100%) should be acquired. Acquisition of a few efficent second-hand bulk carriers (say 50,000 TDW class) is recommendable in order to accumulate operational and commercial experiences as the Steel Mill goes into full operation and tonnages of raw materials are fully increased.

3-3-4. Type of Newly Built General Cargo Vessels

Purpose : Liner services
Type of vessel: Multi-purpose general cargo vessel
Size of vessel: 15,000 TDW class
Speed : 16 - 16.5 Knot

Refer to attached leading particulars and General Arrangement Plan.

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

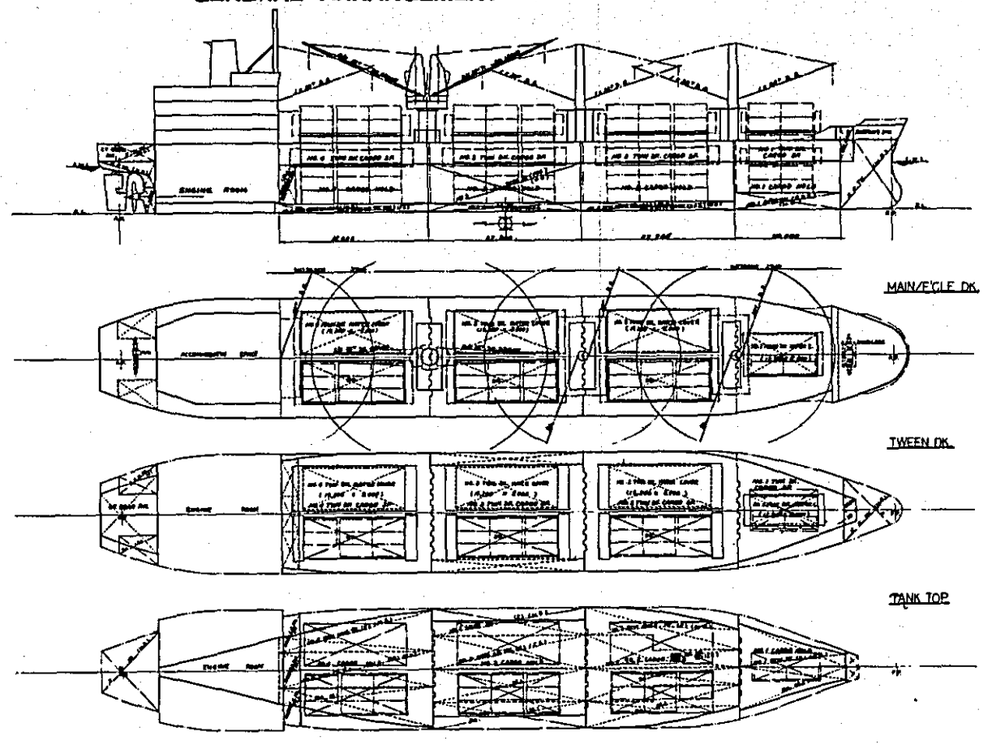
Principal Dimensions : Lo.a. ..... abt. 153 M
Lb.p. ..... 145.00 M
B mld. ..... 23.00 M
D mld. ..... 13.40 M
d mld. designed .... 9.00 M
d mld. scantling ... 9.65 M

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)

3-3-5. Scrapping of Old Vessels

With the above mentioned fleet modernization programme, vessels of over 20 years shall be deliberately scrapped out, closely keeping the pace with the delivery of the new vessels.

3-3-6. Schedule of Lining up the Fleet

(1) General Cargo Vessels

Buildings of new vessels are to be processed in close coordination with the schedule of scrapping of old vessels. The schedule including the delivery time of the vessels built at KSEW and the ones built at foreign shipyards are to be referred to 4-1.

S&B	Vessels to be scrapped out				Newly built vessels	
Year	Year of built	Vessels age at corresponding year	No. of vessels	TDW	No. of vessels	TDW
1980	1953-57	23 - 27	6	68,400	5	75,000
1981	1958	23	8	96,900	7	105,000
1982	1959-60	22 - 23	4	55,000	2	30,000
1983	1960-63	20 - 23	4	46,500	2	30,000
			22	266,800	16	240,000

Remarks: One vessel of the four in the schedule of scrapping in 1982 shall be done in 1983.

(2) Other Type of Vessels

Ten to fourteen old vessels replaced by new ones on liner service would be used as tramps. Due consideration shall be exercised to acquire the necessary number of tankers and bulk carriers in the most appropriate timing by keeping constant market research for those of second hand vessels, for chartering market and for freight one. It will also be required to make necessary preparations to comply with the operation of such vessels by the national shipping company.

In addition to the above type of vessels, consideration should be given to possess three 5,000 TDW class passenger-cum-cargo vessels to be engaged for regular ferry service in the Middle East region to meet the rapidly increasing transportation requirement due to growing passenger and cargo traffic among the neighbouring countries in that region.

3-3-7. Reference: Comparison Table with the Fifth Five Year Plan

(1) The Fifth Five Year Plan

Type	Disposition of the present fleet			New composition		
	Age in 1978	No. of Vessels	TDW	Age in 1983	No. of Vessels	TDW
Liner ships	4-10	4	60,000	0- 5 9-15	21 *1 4 *2	315,000 60,000
Trampers	11-14	15	198,000	16-19	15	198,000
To be scrapped	15-	25	300,000			
Total		44	558,000		40	573,000

(2) Study Result

Type	Disposition of the present fleet			New composition		
	Age in 1978	No. of Vessels	TDW	Age in 1983	No. of Vessels	TDW
Liner ships				0- 5	16 *1	240,000
	4-10	8	113,200	9-15	8 *2	113,200
Trampers	4-10	4	50,800	9-15	4	50,800
	11-14	10	128,700	16-19	10	128,700
To be scrapped	15-	22	266,800			
Sub-Total		44	559,500		38	532,700
Tankers		0	0	0-10	2 *3	150,000
Bulk Carriers		0	0	0-10	2 *3	100,000
Total		44	559,500		42	782,700

Remarks: 1) 3 passenger ships 18,156 TDW and 1 coaster 1,763 TDW excluded
2) *1 newly built ships
3) *2 To be continuously used as liners for main liner routes.
4) *3 To be newly acquired (newly built or second-hand)

4. Financial and Economic Review

4-1. Financial Review

The national merchant fleet replacement plan in conjunction with the improvement plan of KSEW is drawn up.

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 revenus sufficient to cover its investment cost and operational expenses, including interest charges and depreciation, and bring about enough returns, and

(2) whether it would yeild substantial contribution to national economy because it should be considered within the framework of overall economic development planning.

The total investment cost of the fleet replacement plan amounts to US$226.201 million, comprising the building cost of US$224 million, based on the international price per ship as US$14 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$2.201 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:

Table 51. Building Cost Unit (US$1,000)

Year	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.

(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: U.K./ Conti	Asia	U.S.A./ 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 yeild 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.

Comparison of Average Freight Revenue and Operational Profit

Unit (US$1,000/Year)

		UK/ Conti.	Asia	USA/ Canada
Newly Built Vessel	Freight Revenue	5,595	3,098	5,476
	Operational Profit	2,277	269	1,733
NSC Estimate in 1976/77	Freight Revenue	2,932	2,333	3,969
	Operational Profit	n.a.	n.a.	n.a.

(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 Table 53.

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$152.3 million and US$121.1 million in 7th year after start of shipping operations respectively.

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 table and chart show the above results.

Table 53. IRR and IRP

Financial Indicator	In case of no price increase	In case of 8% 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 yrs.	121,118 in 7th yrs.

4-2. Economic Influence

The method of review on the contribution to national economy 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 summarized as 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 over-all 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.

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

III. SHIPBUILDING

1. General Description

The necessity of the development of the shipbuilding industry in Pakistan is, on the stand point of social development, based on the theory 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 consequency 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.

KSEW has the organization of three departments, namely, Shipbuilding Department, Ship Repair Department and Machinery Department including foundry. To improve financial situation of KSEW, the enlargement of ship repairing facilities could be pointed out as one of the most important policies. When the Port QASIM becomes ready for service, and that the Karachi Steel Mill is in operation, the demand for shiprepairings of ore carriers of 70,000 - 100,000 TDW are expected. In this respect, it can be said to be recommendable to set up a new ship repairing yard close to Karachi Steel Mill in the Port Qasim, and to do business in ship repairings as well as in ship breakings at the beginning stage of the yard operation.

The enlargement and reinforcement plan of the shipbuilding facilities have been implemented for long time in line with the national policies for the industrialization of Pakistan.

According to such national policy, the shipbuilding industry in Pakistan has been supported by the Government in the same manners as those in other developing countries, however, KSEW is not yet in such a condition as to get along making a profit on the construction of ocean going vessels without government support.

According to the Fifth Five Year Plan, 11 out of the 21 newly planned vessels are scheduled to be built in KSEW.

The vital role KSEW should play in this planning can be summarized as follows.

(1) Quantitatively for the time being (more presicely, 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.

2. Production Capacity

The comprehensive 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 as below.

	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 Hour (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.

The production capacity based upon three berths is as follows.

Capacity of Berths (TDW)	27,000	15,000	6,000	Total
No's of Berths	1	1	1	3
Berth Occupancy Ratio	80-56	80-40	80-67	-
Berth Period per Ship of Average Size (Month)	14	11	8	
Production Factor	12/14	12/11	12/8	
Annual Production (1,000 TDW/Year)	19-13	13-7	7-6	

Production capacity based on work shops is as follows.

Processed Steel (1,000 TDW/Year)	9

The above figures testify a certain possibility of processing some 12,000 steel tons/year at KSEW by the end of 1983 with the reduction of construction period by 3 months (11 months on berth + 13 months at pier, to, 9 months + 11 months).
The amount of the steel processed in 1982/83 would account for 9,594 ton/year, assuming the invoice steel amount for 15,000 TDW vessel being 4,100 tons.
These figures obviously indicate an enough capability for building scheduled 4 new vessels in the Fifth Five Year Plan.

3. Abilities of KSEW on Technique and Facility View Points

The study of the actual results of shipbuildings in KSEW clarified that (1) the delay in specification decision due to insufficient design capacity brings about (2) the delay in placing orders for principal materials in good time on schedule, attributable to

the above. These seem to be the reason of the construction period being too long.

In order to enhance the production capacity by squeezing the construction period, the reinforcement of the yard control systems should be carried out and up-grading of the engineering capacity based upon the software rendered by advanced countries are also to be contemplated.

Taking account of the great reliance on import for most of the required materials and equipment, however, it may be a reasonable alternative that KSEW might import the right articles in package from abroad, for the construction of the sister vessels of the identical design of the ones procured from foreign shipyards. This method would bring about the betterment of the productivity with the increase of the production amount and of the profits accordingly as the merits of series production of the similar vessels.

Needless to say, all this will be enough for the immediate needs of KSEW, but in the long term vision, the proportion of the KSEW's self-made articles as well as the share of the domestic procurement keeping abreast with the growth of the related industries in Pakistan should be duly increased.

Assuming the annual productivity promotion of KSEW being 3 to 5%, subject to the above stated measures, 12 to 19% reduction of the labour amount per unit steel ton would be expected in 1982/83 and the existing labour hour 550 M.H/Ton would be 424 - 473 M.H/Ton.

Various factors and/or conditions necessary for materializing above possibility can be condensed into the following points.

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

(2) Improvement of working efficiency.
(Block construction, etc.)

(3) Reinforcement of production control system.
(Reorganization, etc.)

(4) Improvement of elemental techniques.
(Gas cutting, edge preparation, etc.)

(5) Improvement of material procurement.
(Strict control on issue of drawings, etc.)

(6) Improvement of availability of installation/equipment.
(Up-grading of maintenance and inspection, etc.)

(7) Additional requirement of workers and their training.

(8) Technology transfer from advanced shipbuilding countries.

(9) Import of design and goods in package.

4. Production Planning of New Shipbuildings

It is essential that the production program should be decided in consideration of the delivery schedule for the ships firmly or tentatively on order, and in accordance with the demand trend for the ship types likely to be constructed in the future.

It is necessary to strengthen the business activities on both qualitative and quantitative aspects and to keep the yard in its utmost operation ever after the final year of the Fifth Five Year Plan, as a premise for establishing the direction of the planning.

As for the procedural steps, the final goal of 12,000 steel tons per year (corresponding to 45,000 TDW/Year) in 1982/83 shall be attained by increasing the present 3,600 steel tons per year (corresponding to 12,000 TDW/Year) by additional 2,000 - 3,000 tons every year.

From the capacity analysis so far attempted in connection with current orders obtained, KSEW in its supplying capacity will be able to deal with 4 general cargo vessels of 15,000 TDW, 10 bulk carriers of 4,000 TDW (on order), some numbers of 6,000 TDW coasters in and around Persian Gulf use and miscellaneous barges.

Number of workers in 1982/83 would be increased to 2,800 on this planning from the one at present 2,000.

5. Financial and Economic Review

5-1. Investment Plan and Its Objective

Concerning the national fleet replacement plan of Pakistan, it has been concluded that out of 16 ships in total, 12 had best be procured abroad and 4 be built at KSEW as sister ship construction system of identical design to the foreign built prototype.

Under the present circumstances, however, the shipbuilding department in KSEW can hardly get rid of negative factors in financial matters, continuing to record deficits at far below the level of the international competitiveness in spite of governmental subsidies.

It should then be aimed at, as a matter of urgency, to make technical and managerial improvements of Shipbuilding Department in KSEW by taking the advantage of this opportunity for these 4 ships to be built at KSEW.

Generally speaking, the shipbuilding facilities in KSEW have long been kept in good order and duly expanded for the purpose of, and in line with, the national policies for creation of employment, promotion of industrialization and saving of foreign exchange, except for minor imperfections still remaining.

At this moment of time, it is planned to up-grade rapidly the productivity of KSEW by making the most of existing facilities and labour force with the least possible investment, subject to planned minor improvement of installations and technical assistance from advanced shipbuilding countries.

The governmental subsidy in this case, is a ministerial aid to be given to the shipbuilder for the cost differential of domestically-built ships over international market prices within the limit of 30% of its total building cost. In this connection, if it happens that KSEW could improve the profitability with the least investment like that, it might rather mean the decrease in the governmental subsidy than an increase in KSEW's own gain.

It is recommended that the investment of US$0.75 million in total should be made as soom as possible (predictably in 1979/80).
US$0.25 million, or one third of the total investment, should be appropriated for an improvement of yard facilities at KSEW and US$0.5 million, or the remaining two-third, for technology transfer through foreign engineers invited from advanced shipbuilding countries and KSEW's experts despatched abroad to learn shipbuilding technology there. Various analyses indicate that a productivity improvement of 5% per annum can be expected from these investments. The yearly amount of cost down (or inversely, an increase in direct profit) due to labour cost reduction, accumulated increases in profit until 1982/83 and total sales in respective years are as shown below.

From the simple comparison between the investment of US$0.75 million and the accumulated increases in profit due to improved productivity by 5% per annum, this amount of investment can be found recoverable within one or two years at the start. From this point of view, it can be said that this investment project reveals its feasibility to the fullest extent, assuring the profit accumulation of almost US$5 million in 1982/83 in excess of the initial investment.

(1) Investment

Year			Effect
1979/80	Physical 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

(2) Build amount and profit increase

Unit (US$10^6)

	1979/80	80/81	81/82	82/83
Build amount	9.76	24.82	33.62	44.76
Reduction in building cost	0.17	0.83	1.69	3.01
Sum of the above	0.17	1.02	2.71	5.72

Note: These calculations are based on wage rate prevalent in KSEW in 1977/78. With the passage of time, these figures will increase, and this increase is not taken into consideration in this report.

5-2, Economic Influence

(1) Production Increase

The production at KSEW is expected to reach US$45.7 million in 1982/83, amounting to as much as seven times of that in 1975/76, US$6.4 million.

(2) Saving of Foreign Exchange

The shipbuilding project of 4 general cargo ships of 15,000 TDW at KSEW will ensure a saving of US$12 million by 1982/83, on condition that

the design and materials for this project should be procured from abroad in package deal.

(3) Increase in Employment

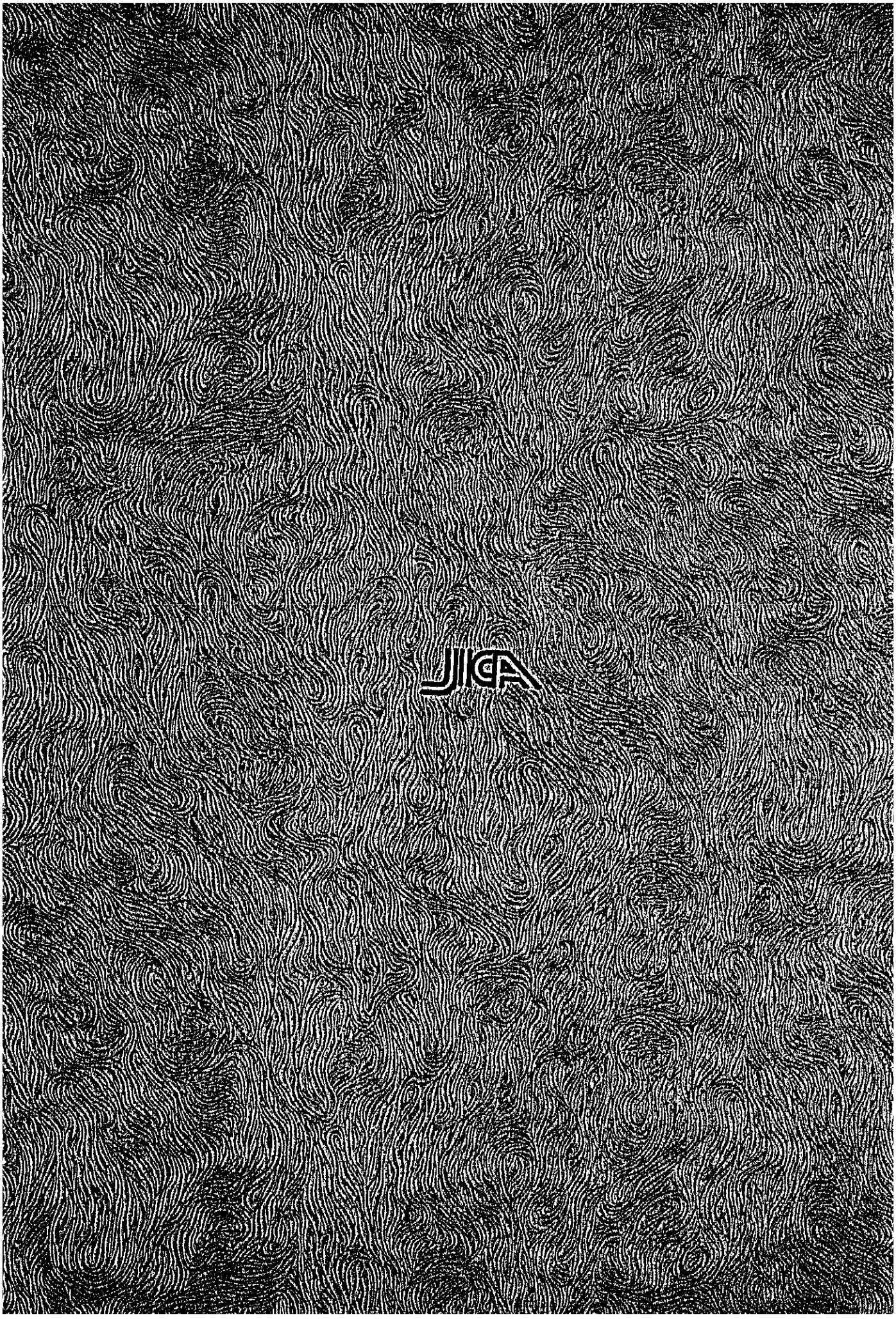
The required number of workers in shipbuilding departments at KSEW will be around 2,800 in 1982/83. The balance of 800 men over the existing 2,000 will create new employment opportunities in the labour market.

(4) Modern Skills to KSEW

New Modern skills and technology would be brought in by the foreign shipbuilding engineers in the fields of production planning, control, designing, steel cutting, welding, assembling, etc. for improvement of productivity at KSEW.

(5) Contribution to the National Industrialization

Shipbuilding industry is said to have a very wide and deep substructure surrounding it, such as machinery, steel processing, electric and electronic, woodwork, painting industries, etc. and is expected to have extremely large effects on improvement and development of technology and productivity at these related industries creating innumerous new employment opportunities.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