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THE REPUBLIC OF THE PHILIPPINES
PAN-PHILIPPINE HIGHWAY FERRY SERVICE FOLLOW-UP SURVEY REPORT

AUGUST, 1977

JAPAN INTERNATIONAL COOPERATION AGENCY

PREFACE

In response to a request made by the Philippine Government, the Japanese Government made a decision to conduct a survey related to the ferry boat construction project at a shipyard in the Republic. Japan International Cooperation Agency was assigned to conduct the survey.

The present survey is a follow-up survey of the feasibility study on the Pan-Philippine Highway Ferry Service Project which was conducted by Japan International Cooperation Agency in 1976. The survey team consisted of four members. Mr. Tetsuya Harada of Ship Bureau in Ministry of Transport was named as the leader.

The survey team made a field survey for ten days (July 4 - July 13, 1977). The team made various studies after it returned to Japan and prepared the present report.

The survey team expresses deep gratitude to those who cooperated with the team in the survey.

August, 1977

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CONTENTS

I. Purpose and Schedule of Survey

This is a follow-up survery of the feasibility study on the Pan-Philippine Highway Ferry Service Project which was conducted in January - February, 1976, by a survey team dispatched by Japan International Cooperation Agency. The purpose of the present survey was to estimate the cost and the term required for constructing a 59 m type ferry boat in the Republic and to study the need for technological transfer from Japan to the said construction. The results are reported here.

The field survey was limited to only one shipyard because of the time restriction. The survey team visited BASECO (Bataan Shipyard & Engineering Co., Inc.), which was recommended by the Philippine Government for the ferry boat construction under the present project.

The survey team consisted of the following members. The team stayed in Manila for ten days from July 4, 1977, and visited the governmental offices concerned and BASECO.

The schedule of the team is given in Table 1.

Members of survey team:

Leader	Tetsuya Harada	Ship Bureau, Ministry of Transport
Member	Yoshio Kimura	Ship Bureau, Ministry of Transport
Member	Minoru Yamamoto	Overseas Shipbuilding Cooperation Center (part-time staff)
Member	Yoshio Arai	

II. Readiness for Ferry Boat Construction in the Republic

II-1. Ferry Boat Construction Project and Operation Plan

The Philippine Government has a plan to construct two 59 m type ferry boats for Surigao straits and San Bernardino Straits. The Government plans to have one ferry boat built in Japan and the other at BASECO in the Republic partly as a means of technological transfer to the Philippine Ship-building industry. The Government proposed this plan as a priority project in the Sixth Yen Package Loan Project.

This ferry boat construction project has been planned by Department of Public Highway (DPH), and Maritime Industry Authority (MARINA) has provided technical advice. DPH is to be in charge of the operation of ferry service.

The Philippine Government insisted at the conference that at least one more ferry boat must be built in provision for some accident of a ferry boat in service and a possible increase of traffic volume in the future. The survey team agreed that the Philippine Government's argument was reasonable, but suggested that further studies should be made on the third ferry boat in consideration of economic problems. The Philippine Government agreed to the team's suggestion. A summary of the proceedings of the conference was prepared accordingly (Refer to the Annex). The Philippine

Government proposed to construct the third ferry boat in the Republic. However, a decision was made to discontinue the study on the third ferry boat at the conference.

The Philippine Government plans to allow free entry of materials to be used for the present project and to take a special measure for a long-term stay of engineers.

Concerning a terminal site in the southern edge of Luzon Island, the Philippine Government withdrew the previous insistence of Padang Point and promised to select another terminal site on the basis of economic consideration and to notify the survey team of it within a month.

II-2. Principal Dimensions of Ferry Boats

Two 59 m type ferry boats are to be constructed under the present project. This is the ferry boat type recommended by the survey team dispatched last year. The principal dimensions of this ferry boat are given below. Its general arrangement is shown in Fig. 2.

Principal Particulars of Ferry Boat

Length Overall		65.50 M
Length Design Waterline		61.60 M
Length between Perpendicular		59.00 M
Breadth (molded)		12.50 M
Depth (molded)		4.60 M
Draught (full load)	(about)	3.35 M
Displacement (full load)	(about)	1,350 TON
Gross tonnage	(about)	1,000 TON
Main Engine (max BHP 2 shaft)		3,200 PS
Sailing Speed		14.5 knot
Endurance Distance	(about)	1,200 miles

Accommodation	
Complement	22 persons
Passenger	400 persons
Car Capacity (converted into equivalent of 8-ton trucks)	14 trucks
Ship's Class	NK (NS* MNS*)

The Philippine Government must have a consultant prepare basic plans for bidding according to the principal dimensions.

II-3. BASECO

BASECO (Bataan Shipyard & Engineering Co., Inc.) was founded in February, 1973, when the management of NASSCO (governmental shipyard) was transferred to the private enterprise. Its authorized capital and paid-up capital amount to 60 million pesos (about 2.4 billion yen) and 12 million pesos (about 0.5 billion yen), respectively. It is a purely private capital enterprise.

BASECO has repairing facilities at Manila Port and a shipyard at Mariveles Harbor. At present, BASECO has the largest shipbuilding capacity in the Republic. Mariveles is located at the southern edge of Bataan Peninsula on the west side of Manila Bay. Its distance from Manila City is 40 km in a straight line on the sea. It takes one hour and a half from Manila City by a hydrofoil boat. It has the population of 30,000. An industrial commune is being constructed and various plants are in operation at Meriveles.

BASECO Mariveles owns 300 ha of land at the right edge of Mariveles City. Its plant site is 27 ha. The shipyard is located in the bonded area, so imported materials can be unloaded directly at the shipyard.

Fig. 3 is a map of the area around Meriveles.

III. Present Situation and Evaluation of Equipments, Organization and Technological Standards of BASECO

III-1. BASECO Merriveles

(1) Equipments

The foundation and the nature of BASECO were described before. A synchro lift project (facility to move a vessel under construction or repairing in transverse direction) and a new expansion project (facility to construct a 65,000 DWT vessel with a 80 ton crane, a 60 ton crane and a 45 ton crane) are in progress. It has a good fitting out basin (Maximum length: about 300 m, equipped with a 45 ton crane). The water depth is about 8 m and the tidal difference is about 1.2 m. The road from the shops to the fitting out basin is paved satisfactrily, if not of the capacity of load bearing.

[Major Shipbuilding and Repairing Facilities]

(A) One slipway for shipbuilding and reparing

Capacity : 2,300 GT (with two 48 ton cranes)

(B) One dry dock for repairing

Capacity : 10,000 GT (with two 40 ton cranes)

(C) One set of synchro lift and related equipments

Capacity : 2,000 GT

It is to be expanded to 3,000 GT in future.

(D) One building berth (semi dry type) for shipbuilding and repairing

Capacity : 65,000 DWT (It is already available.)

The related facilities are being constructed.

[Related Shops and Facilities]

(A) One plate shop (Hull materials are worked and assembled here. Small parts for fittings are fabricated. It has working machines and about 220 welding machines.)

(B) One mahcine shop

(It has a 40 feet (max.) lathe and about 40 machining machines.)

(C) One mold loft and wood work building

(D) One pipe and sheet-metal shop

(It has two old-fashioned pipe benders.)

(E) One electrical shop

(F) Oxygen and acetylene plant (It has facilities for generating and supplying oxygen and acetylene.) (Carried within shipyard in bottles; no pipe for central control)

(G) Power facilities

° Generators : Total 2,000 KW

° Emergency feeding facility : 600 KW

(H) Others

° Four parts storages (Total 8,000 m^2)

° One paint and oil storage

° One set of shot blast

° Several vehicles (mobile cranes & truck cranes etc. 50 tons (max.))

° One set of mile posts for trial trip

° Post intervals 1 mile

° Water depth About 20 m

° Compressed air feeding facility : 7 kg/cm^2 (original pressure)

(2) Records of Shipbuilding

BASECO has been engaged mainly in reparing and converting works since the period of NASSCO (predecessor of BASECO). BASECO has experiences of construction of barges, various small patrol boats, tug boats and hull extension works. BASECO worked on eighty-four vessels

during the seventeen years between 1955 and 1972. BASECO has constructed thirty-seven vessels (barges, cargo boats etc.) since 1973. If the steel that was used for vessel construction in 1973 is assumed as 100 (index), the index rose to 738 during the first half of 1977. (Refer to Table 5.) BASECO's annual sales is 3.5 billion yen (after conversion to yen), which is accounted mostly by repairing work as yet. It is estimated that vessel construction accounts for 25 ∿ 35% of the total sales.

(3) Organization and Scale

Fig. 6 shows where Marvilles Yard is located in the entire organization of BASECO. Table 7 shows the classification and the number of field workers. Additionally, about thirty subcontractors (engaged mainly in miscellaneous works, including painting and sand blasting, and employed on a temporary basis). So-called outside manufacturing system is hardly adopted, and all the works are done within the yard. But they insist that BASECO has a desire for growth and development of the system if orders of vessel construction are given continuously.

BASECO has approximately 900 employees at the shipyard. However, the emphasis is laid on Ship Repairing Division (S.R.D.) If a ferry boat is to be constructed here, the emphasis is switched to Ship Building Division by many

transfers from S.R.D. and some reorganization. Shipyard representatives insist that labor forces can be supplemented sufficiently for full year operations. However, it is still questionable whether sufficient skilled workers can be obtained for ferry construction, because ferry construction will require many labor forces.

(4) Technological Standards

Their product (750 DWT-LCT [with ship's classification of NK] which was being launched at the time of the visit) indicated that the level of basic technology is higher than expected. This is the result of BASECO's efforts. However, it also seems to be the fruit of subtle assistances by a private Japanese enterprise (previously Hakodate Dock, currently Koyo Dock) under a business tie-up.

III-2. Evaluation of BASECO Marvilles

(1) General Evaluation

The survey team investigated all the processes from designing to completion great details. The results are summarized below.

(A) Sufficient equipments are available for each process. However, the following two processes can be a bottle neck for ferry construction. They must be inspected,

maintained and improved.

(a) Inadequacy of small equipments to be used for pipe bending at pipe shop

(b) Inadequacy of area of surface plate to be used for linear heating of hull plates etc. at plate shop

At present, small outfitting parts are fabricated at the shipyard. This must be subcontracted to another plant for efficiency and mass production.

(B) Technological standards have been generally improved as a result of the technological cooperation with Japanese shipbuilders in the past.

(C) The basic technology of construction and engineering has been established. The technological level of shaft and rudder fabrication was quite high because of sufficiently accumulated experiences. Welding skills were unexpectedly high. However, gas cutting produces rough surfaces. Therefore, oxygen purity must be checked and cutting precision must be improved.

(D) The shipyard has enthusiasm for shipbuilding and fabrication.

A ferry boat is characterized by structural complexity of the hull and outfittings. Therefore, high machining and

engineering precision and high-level technology are essential for ferry boat construction. The survey team concluded that ferry boat construction would be possible at BASECO Marviles if adequate technological cooperation (assuming technological transfer) is provided.

(2) Evaluation of Equipments (Refer to Fig. 4 on P.)

(A) Building berth and block size

The shipyard plans to use either the slipway (2,300 GT) or the synchro-lift (2,000 GT) for ferry boat construction. Both them can be used. Semi block contruction method should be used. Block partitioning must be planned by keeping the maximum block size below 40 tons. Keel site changes when the synchro-lift is used. Its behavior should be followed precisely by taking records and the keel block must be used, if necessary.

(B) The equipments for hull construction are generally satisfactory.

(C) The equipments for outfittings (including the fitting out besin) are generally satisfactory. However, the pipe shop should be improved as stated before.

(D) The stock yards have enough space and satisfactory equipments for the indoor or outdoor storage of purchased

articles and materials. The bonded area within the shipyard is large enough.

(E) Inspection equipments in general (including machines for performance check at trial and mile posts), machineries for testing materials and machineries for testing non-destructiveness are satisfactory.

(3) Evaluation of Management Ability

(A) Management Ability for Supply and Purchase of Materials

(a) Procurement of materials - Individual arrangement for materials and parts enabled (Refer to Table 8)

(b) Inspection, storage and supply - Both papers and articles are managed well. It is desirable to devise racks for the respective commodities so that they can be seen where they are stored.

(B) Management Ability of Process

(a) Process management is satisfactory at no stage of hull and outfitting works. The Philippine Government has a desire to complete a ferry boat with the same precision and accuracy as a Japanese shipbuilder both smoothly and as quickly as possible. Furthermore, ferry boat construction involved highly complicated

works. The means that technological transfer with emphasis on process management is essential.

(b) Precision standards and inspection standards for each stage of construction have been partially established, but are generally incomplete. Neither checking methods, nor checking systems have been established. This is where Japanese cooperation is essential.

(4) Evaluation of Technological Ability

(A) Designing

It is estimated that a Japanese shipbuilder should provide 100% of basic drwings, 90% of detailed drawings and about 60% of work drawings (hul marking plans, deck and engine pipe assembly drawings, parts drawings, wiring diagrams for each electric outfitting system etc.). The remaining drawings will be made by field staff in accordance with rules after making a coordination among relating fields. However, the current basic designing ability of BASECO seems insufficient for making detailed drawings for ferry construction. It is extremely important to given detailed explanation and information (codes, symbols, manual etc.) on drawing supplied by Japan. Japanese technical cooperation will be essential in this field.

(B) Engineering

The basic engineering standards of hull and outfittings are generally high owing to the business tie-up with Japanese Enterprises in the past. However, thorough advising and guiding on the application of major engineering techniques are necessary because they have never experienced ferry construction.

One of the major difficulties of ferry construction is the problem of outfittings work of the engine room. The following three operations must be carried out in parallel. They are the delivery period management of machineries (including the main engine and the auxiliary engine) to be installed in the engine room, preparatory work for machinery installation and the assembly work of strength members in the engine room. For a smooth progress, the relation between these works and the delivery period of machineries must be studied well for determining the priority order of these works.
It is essential to establish a clear policy for outfittings work at an early stage, to manage the delivery period of parts completely and make a coordination among mutually interfering equipments on drawings at each stage prior to the beginning of construction. Inadequate timing will give a decisive blow to the quality and time control,

leading to a chaos. This can result in low quality and high cost.

Some other parts require similarly complicated works. BASECO does not have sufficient all-round ability for such complicated works involved in outfitting.

IV. Ferry Construction Term and Technological Transfer

IV-1. Basic Principles

The Philippine Government is anxious to complete ferry construction as soon as possible in view of the progress of the road construction work. On the other hand, the Philippine Government is also expecting the transfer of shipbuilding technology through ferry construction. Concerning the ferry construction in the Republic, the survey team established the following basic principles to meet the Philippine Government's requests on construction term and technological transfer.

- The construction term should be as short as possible.
- The ferry boat to be constructed should be of high standards.
- Direct guidances by Japanese engineers should be minimized to ensure effective technological transfer.

IV-2. Construction Term

It is estimated that at least eighteen months will be required for construction of a ferry boat at BASECO. Since this is the first experience for the Philippine shipbuilding industry and in view of 1) the technological transfer to be made from Japan, 2) thorough process control required of such precision ship, 3) requirement for entrancing the technological transfer effect, 4) arrangements for material acquisition, and 5) delay in delivery of the drawings. BASECO representatives insisted that they could construct a ferry boat almost simultaneously with Japan. However, some time lag between the construction term in the Philippines and that in Japan brings about the following advantages.

To implement effective technological transfer, the survey team suggests to train Philippine designers and field engineers at a Japanese shipyard which is to construct the 1st ferry boat. They will completely master shipbuilding techniques they acquire in Japan only if they actually use them at a Philippine shipyard.

Further, the materials are preferably delivered in two batches, after the construction is started in Japan to safeguard against difficulties that may arise in material aquisition.

Some time lag is desirable from the view point of

drawings also. In Japan, detailed drawings, mold loft and films are completed after the conclusion of a contract and in parallel with construction work. With some time lag, BASECO will be able to use Japanese drawings and films effectively to attain high precision and to cut down costs.

The length of a period required for each stage is given below.

Contract ~ Beginning of working	4 months
Beginning of working - Mounting on building berth	3.5 months
Block mounting - Launching	5 months
Launching - Completion	5.5 months
Total	18 months

It is estimated that ten months will be required for building the 1st ferry boat in Japan.

(Refer to Table 9 on the schedule)

IV-3. Technological Transfer

(1) Training in Japan

(A) Design Engineers

Basic designing of hull

Basic designing of outfittings

Basic designing of engine

Basic designing of electric equipments

One engineer from each of the above fields should be trained for fifty days. (Total: 4 engineers and 200 man-days) They are to be trained at the Japanese shipbuilder of the 1st ferry boat during the period of designing. They are to grasp the basic performances of the ferry boat and learn technical terms used for ship designing, techniques for translating the design drawings into work drawings of any particular parts, and techniques for evaluating the data of performance tests given at the time of completion.

(B) Field Engineers

Field work of hull

Field work of outfittings

Field work of engine

Field work of electric facilities

One engineer from each of the above fields should be trained for 120 days. (Total: 4 engineers and 480 man-days)

They are to learn special techniques among the field works of ferry construction.

(2) Engineers to be Dispatched from Japan

(A) A Japanese shipbuilder will dispatch the following engineers to ensure sufficient construction precision and to coordinate and supervise construction works.

General leader and coordinator	1	480 days
Precision control and inspection guidance		
Hull engineer	1	90 days
Hull fitting engineer	1	90 days
Machinery fitting engineer	1	90 days
Electric fitting engineer	1	90 days
Total	5	840 mandays

(B) A Japanese shipbuilder will dispatch the following engineers to be consultants of drawings and to effect technological transfer in work drawing preparation.

Engineer for work drawings of hull	1	20 days
Engineer for work drawings of outfittings	1	20 days
Engineer for work drawings of engine	1	20 days
Engineer for work drawings of electric equipments	1	20 days
Total	4	80 mandays

(C) A Japanese shipbuilder is to dispatch the following foreman-class workers for field guidances and precision control.

Hull Work		
Loft and marking	1 man	90 days
Bending and straightening	1 man	90 days
Gas cutting and welding	1 man	90 days
Assembly and fitting	1 man	90 days
Hull Fitting		
Pipe fabrication and installation	1 man	225 days
Iron parts fabrication and installation	1 man	210 days
Machinery Fitting		
Pipe fabrication and installation	1 man	210 days
Main engine and auxiliary engine installation and operation	1 man	230 days
Electric Fitting		
Installation	1 man	150 days
Navigation instruments and wiring installation	1 man	90 days
Total	10 men	1,475 mandays

In sum, a Japanese shipbuilder will dispatch nineteen engineers (2,395 mandays) to the Republic. (Refer to Table 10)

V. Role of Consultant

DPH (Department of Public Highway) is to be the owner of the two ferry boats. DPH is recommended to select a

capable consultant with sufficient consulting experiences in ferry construction. With such a consultant, DPH will be able to obtain accurate understanding of important conditions, including performances, specifications, delivery term and price and smoothly obtain ferry boats complying with the said conditions.

The services which a consultant should offer are listed below.

(1) Preliminary study

A consultant should grasp the conditions given by the owner and advise the owner with regard to the procurement method of ferry boats (bidding method, methods of obtaining materials, drawings and engineers, method of accepting trainees etc.) and its time schedule.

(2) Preparation of basic plans and other documents

A consultant should prepare basic plans (speicifications, general arrangement plan, estimation of gross tonnage, capacity plan, stability calculation, midship section plan, engine room arrangement plan, electric power table, composition of profile and piping diagram etc.) according to the ship owner's desire. A consultant should also make a list of materials and a list of engineers required for constructing the second ferry boat.

(3) Preparation of tender documents

(4) Tender evaluation

(5) Supervision of construction work (Shipyard in Japan and shipyard in the Republic)

(6) Inspection

A consultant should inspect the quantity, number, standards, capacities and performances of materials and engineers as they are supplied by a Japanese shipbuilder according to a list of materials and a list of engineers prepared by (2).

(7) Advice for smooth supply of drawings, materials and engineers. A consultant should make necessary urge and advice to ensure smooth supply of drawings (basic design drawings, work drawings, templates for lines and marking etc.), materials and engineers to be supplied by a Japanese shipbuilder.

(8) Advice on contract between DPH and Philippine shipyard

(9) Services related to delivery of ferry boats

The estimated costs of the above consulting services are given in Table 11.

VI. Estimate of Ferry Construction Cost

The estimated ferry construction costs are given in Table 12. The construction cost of the 1st ferry boat (to be built in Japan) is approximately 1.4 billion yen (of which almost 100% are in foreign currency). The cost for the 2nd ferry boat (to be built in the Republic) is approximately 1.5 billion yen (of which about 1 billion yen is in foreign currency). The total cost is approximately 2.9 billion yen (of which about 2.4 billion yen is in foreign currency.)

With regard to the cost of materials, the 2nd ferry boat requires 100 million yen more than the 1st ferry boat because it was assumed that all the materials for the 2nd ferry boat would be shipped from Japan. For the indirect expense, the 2nd ferry boat requires 100 million yen less than the 1st ferry boat for the following reason. The 2nd ferry boat requires 560 million workhours which account for four times as much as the 1st ferry boat (130 million workhours). However, the unit price of manhour in the Republic is 360 yen (after conversion to yen) which is about 1/7 of that in Japan (2500 yen). So the total cost of the 2nd ferry boat is higher than that of the 1st by 100 million yen, which is accounted by the difference of the engineering fee (160 million yen) for the 2nd the designing cost (60 million yen) for the 1st. The designing cost of the 1st ferry was estimated on the assumption that design drawings would be

transferred to BASECO, so the difference of construction cost between the 1st and the 2nd ferry will be substantially bigger than formerly described. Of the materials to be used for the 2nd ferry, the commodities listed in Table 8 (p.) seem available within the Republic. However, it was assumed that all the materials should be shipped from Japan since all the necessary information on their standards and quality was not available to us.

The reserve cost was included in provision for some possible increases in prime costs, conultant fees or sailing cost because of inflation, delayed completion etc. (It is assumed that the 1st ferry boat and the 2nd should be delivered in the middle of and at the end of 1979, respectively.)

VII. Economic Effects Obtained by Ferry Services

The estimated ferry construction cost which was arrived at by the present survey is 9.4% (1st ferry boat) or 17.1% (2nd ferry boat) higher than the estimated cost which was arrived at last year. However, they do not have large influence on the calculation of economic effects. The internal rate of return of this project will be as give below if the economic benefits of ferry services, expenses of ferry services and terminal investments estimated by the previous survey are assumed unchanged.

Internal rate of return

		(previous)
San Bernardino Straits (The ferry boat to be built in Japan is put to services in 1980.)	10%	(10%)
Surigas Straits (The ferry boat to be built in the Republic is put to services in 1980.)	8%	(9%)

VIII. Conclusion

The survey team investigated BASECO. The team concluded it possible to construct a 59 m type ferry boat on an assumption of technological transfer from Japan.

Technological transfer from Japan can be implemented by constructing a ferry boat of the same type in Japan, by training engineers of BASECO at the Japanese shipyard and by dispatching Japanese shipbuilding engineers to BASECO.

At least 18 months will be required between contract and delivery in consideration of technological transfer. (10 months for the ferry boat to be built in Japan)

Eight Philippine engineers (680 mandays) should be trained in Japan.

Nineteen Japanese engineers (2,395 mandays) should be dispatched from Japan.

If the 2nd ferry boat is built at BASECO, the construction cost will be 1,522 billion uen. (The construction cost in Japan will be 1,417 billion yen) including reserve cost.

For a smooth progress of this project, it is recommended that the Philippine Government should order a Japanese shipbuilder to build one ferry boat and to conclude a contract of materials supply and technological transfer with the same shipbuilder if possible.

For a quick progress of this project, it is recommended that an advisor (consultant) for the Philippine Government should be dispatched from Japan soon.

SUMMARY RECORD OF DISCUSSIONS
BETWEEN THE PHILIPPINE GOVERNMENT & THE JAPANESE SURVEY TEAM
ON THE FERRY BOAT CONSTRUCTION PROJECT
IN THE REPUBLIC OF THE PHILIPPINES

The Japanese Sruvery Team on the Ferry Boat Construction Project of the Republic of the Philippines stayed in Manila for ten (10) days, from July 4 to 13, 1977, for the purpose of estimating the cost and duration of the domestic construction of a 59 m type ferry boat and evaluating the need for Japanese technical cooperation to the said construction. This is a follow-up survey of the feasibility study on the Pan-Philippine Highway Ferry Service Project which was conducted by the Japan International Cooperation Agency (JICA) last year.

Before starting a detailed survey, the Japanese Survey Team and the Philippine Government officials concerned had meetings on basic conditions for implementing this survey.

The following conclusions were obtained:

A. The Philippine Government confirmed that two (2) ferry boats of the same type with a length of 59 m (Lpp) would be proposed to the Japanese Government for inclusion in the Sixth Yen Package Loan Project.

B. The Philippine Government and the Japanese Survey Team agreed to build one boat in Japan and the other at BASECO Shipyard in the Philippines in order to effect the transfer of technology through technical cooperation --- by traning Philippine engineers in Japan and likewise sending Japanese engineers to the Philippines during the above-mentioned construction.

C. The Philippine Government pointed out the necessity of at least, one (1) additional boat for carrying out the Project, an idea the Japanese Survey Team found reasonable enough. Thus, the Team agreed that a discussion should be held between the Japanese Government and the Philippine Government concerning the construction of an additional boat in the future and to make further studies on the economic problems relevant to it.

D. The Philippine Government proposed the construction of the additional boat in the country.

E. The Philippine Government admitted that the proposed Padang Point was economically unfeasible and promised that the decision on the selection of the southern part of Luzon as terminal site would be submitted in one month's time after considering the economic problems of the latter site.

July 12, 1977

JOSE DAVID Director Planning & Project Development Office Department of Public Highways	TETSUYA HARADA Leader Japanese Survey Team

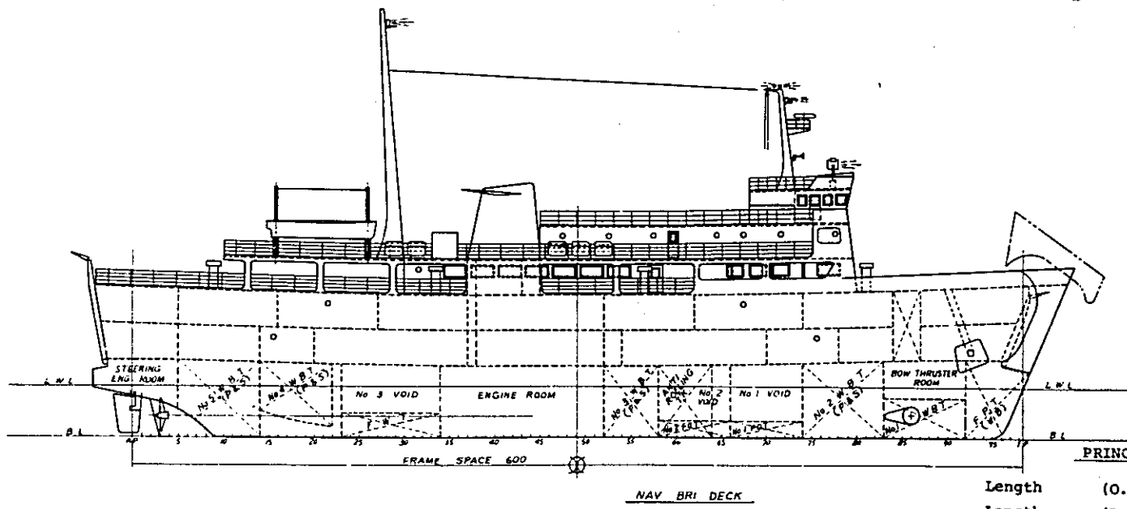
Table 1 Survey Schedule

Date	Visit	Remark
July 4 (Mon.)	Departure from Tokyo at 9.15 AM (TG601) and arrived in Manila at 3 PM	The team met Secretary Kono of Japanese Embassy in the Philippine and Director Yoshida of JICA's Manila Oversea Office.
July 5 (Tue.)	NEDA (National Economic and Development Authority	The team met Mr. Corpus, Mr. Sunga (NEDA) and Mr. Santos (MARINA) and discussed the schedule and the basic conditions (the number and the type of ferry boats etc.).
	MARINA (Maritime Industry Authority)	The team visited Administrator Tanseco for courtesy call. The team discussed with Capt. Basco and Capt: Domingo on the basic conditions.
	Japanese Embassy in the Philippines	The team discussed with Councilor Taniguchi and Secretary Kono on the survey schedule.
	Japanese Ambassador's official residence	The team visited Ambassador Mikanagi for greeting.
	Manila Office of BASECO (Bataan Shipbuilding and Engineering Co., Inc.)	The team met President Ruiz etc. to discuss the schedule of visit to BASECO Marivelles

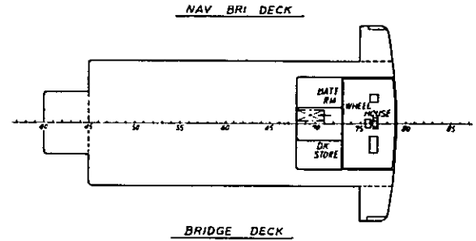
July 6 (Wed.)	BASECO Marivelles	The team discussed with Vice President Sarmiento etc. on the facilities and technical standards at BASECO Marivelles. The team inspected the shipyard.
July 7 (Thur.)	DPH (Department of Public Highway)	The team discussed with Vice-Minister Rodrigez, Mr. David (DPH) and Capt. Domingo (MARINA) on the basic conditions, (the number and the type of ferry boats etc.).
July 8 (Fri.)	BASECO Marivelles	The team studied the facilities and the technical standards of BASECO Marivelles in details. (Mr. Vital accompanied the team.)
July 9 (Sat.)	Same as above	Same as above
July 10 (Sun.)	Holiday	
July 11 (Mon.)	MARINA	The team reported the result of the survey at BASECO Marivelles to the staff of BASECO and MARINA.
	Japanese Embassy in the Philippines	The team made an interim report to councilor Taniguchi and Secretary Kono.

July 12 (Tue.)	NEDA	The team made an interim report to the staff of NEDA, DPH and MARINA. The both parties reached an agreement concerning the basic conditions, (the number and the type of ferry boats etc.)
	Thanksgiving party given by the survey team	
July 13 (Wed.)	Departure from Manila at 2:30 PM (JL 742) Arrived in Tokyo at 7:30 PM	

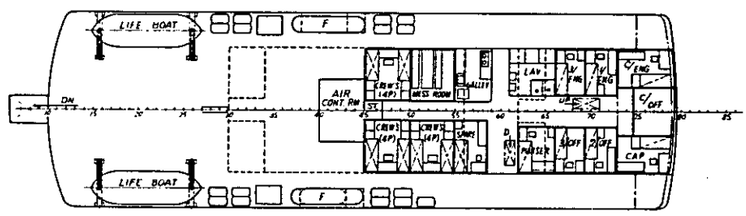
Fig. 2. General Arrangement Plan of 59 m Type Car Ferry



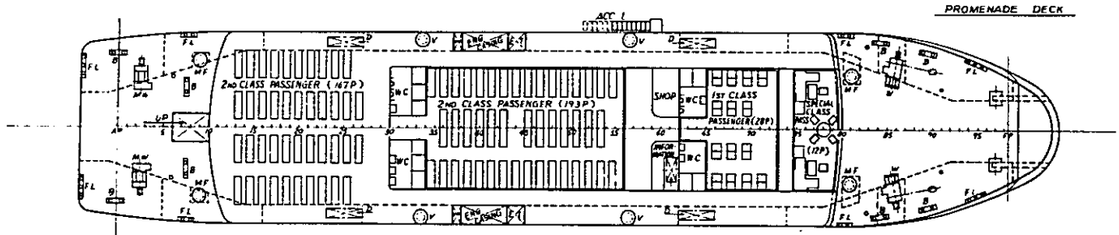
NAV BRI DECK



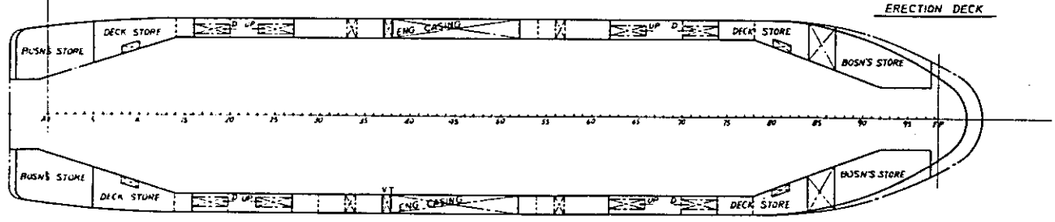
BRIDGE DECK



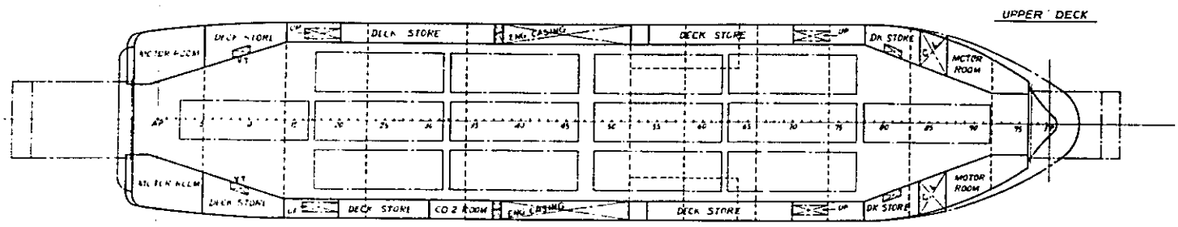
PROMENADE DECK



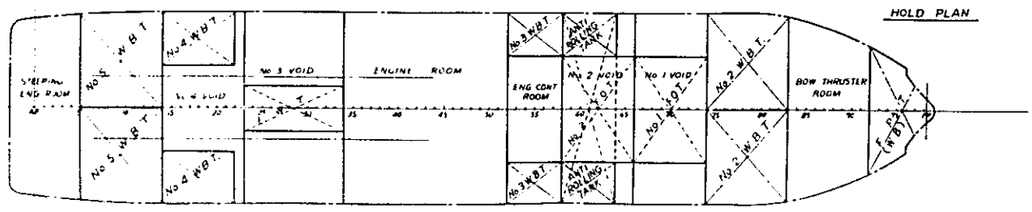
ERECTION DECK



UPPER DECK



HOLD PLAN



PRINCIPAL PARTICULARS

Length	(O.A.)	(About) $65^{m}50$
Length	(L.W.L.)	$61^{m}60$
Length	(P.P.)	$59^{m}00$
Breadth	(MLD)	$12^{m}50$
Depth	(MLD)	$4^{m}60$
Draft	(MLD)	(About) $3^{m}35$
Gross Tonnage		(About) 900^{GT}
Full Load Displacement		1350^{T}
Complement		22P
Passenger		
Special Class		12P
1st Class		28P
2nd Class		360P
Total		400P
Truck ($8^{m}50$ x $2^{m}50$)		14
Main Engine		1600^{PS} x 2
Speed (Service)		About 14.5^{KT}

59m Type Car Ferry *FERRY*

General Arrangement *MENT*

Fig. 3 Map around Marvilles

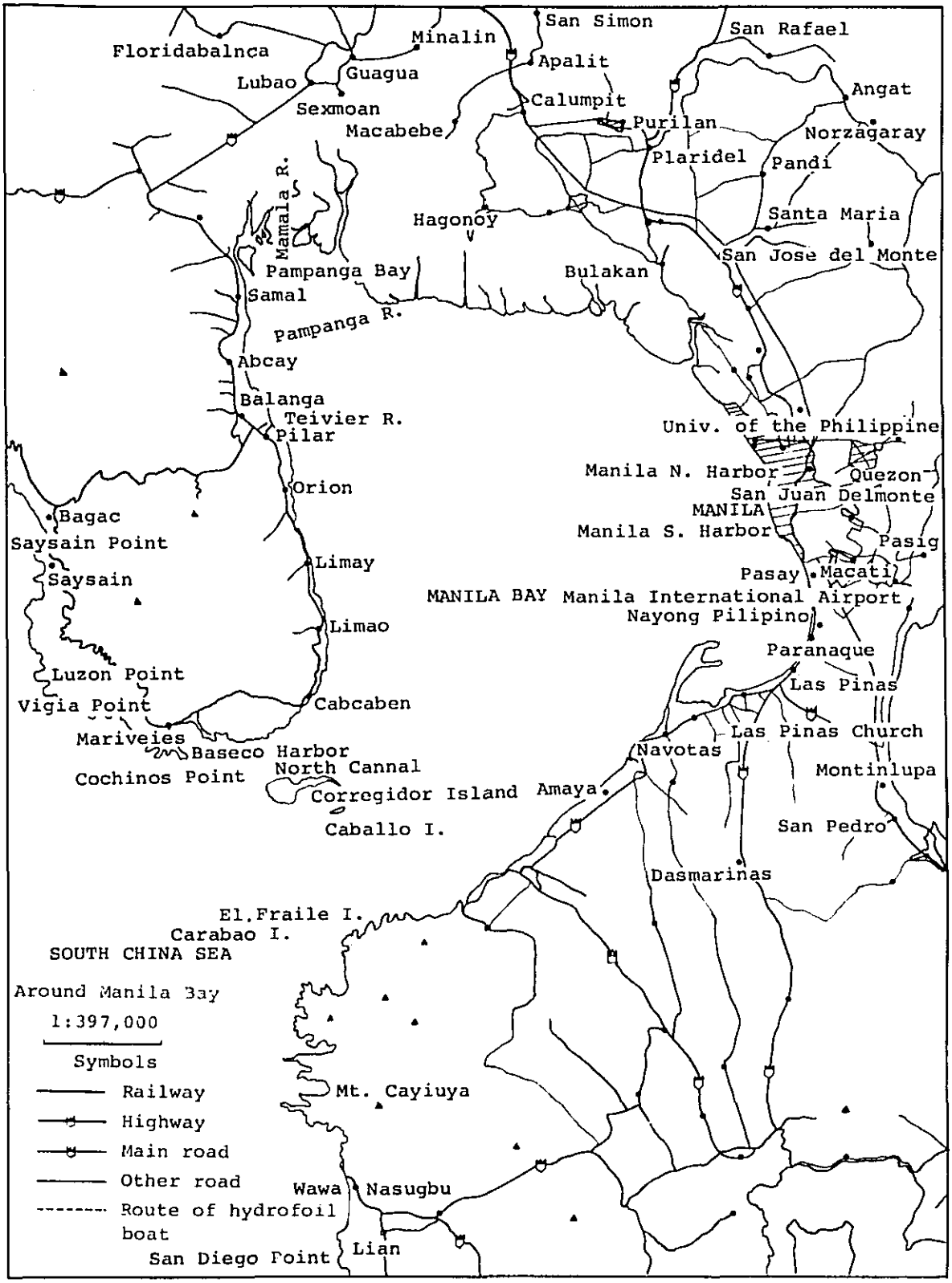
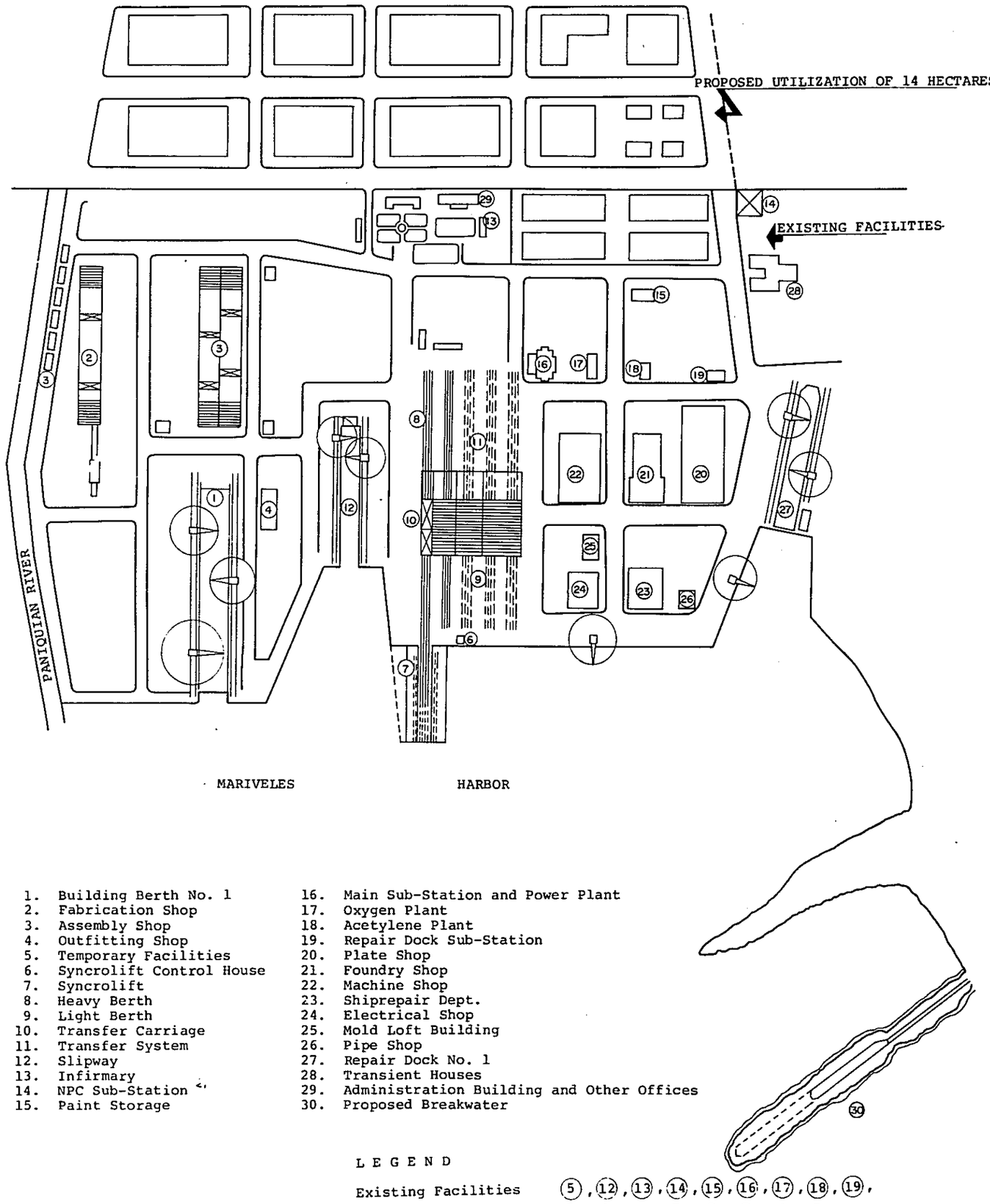


Fig. 4 Layout of BASECO Marivelles (Scale 1/400)



1. Building Berth No. 1
2. Fabrication Shop
3. Assembly Shop
4. Outfitting Shop
5. Temporary Facilities
6. Syncrolift Control House
7. Syncrolift
8. Heavy Berth
9. Light Berth
10. Transfer Carriage
11. Transfer System
12. Slipway
13. Infirmary
14. NPC Sub-Station
15. Paint Storage
16. Main Sub-Station and Power Plant
17. Oxygen Plant
18. Acetylene Plant
19. Repair Dock Sub-Station
20. Plate Shop
21. Foundry Shop
22. Machine Shop
23. Shiprepair Dept.
24. Electrical Shop
25. Mold Loft Building
26. Pipe Shop
27. Repair Dock No. 1
28. Transient Houses
29. Administration Building and Other Offices
30. Proposed Breakwater

L E G E N D

Existing Facilities ⑤, ⑫, ⑬, ⑭, ⑮, ⑯, ⑰, ⑱, ⑲, ⑳, ㉑, ㉒, ㉓, ㉔, ㉕, ㉖, ㉗.

On Going Project Shipbuilding Facilities ② ③

Proposed Shiprepair Expansion Facilities ⑨ ⑪

Proposed Project ④ ⑧ ⑩

Cpmeted Project ① ⑥ ⑦

Table 5 Vessels Constructed at BASECO Marvilles

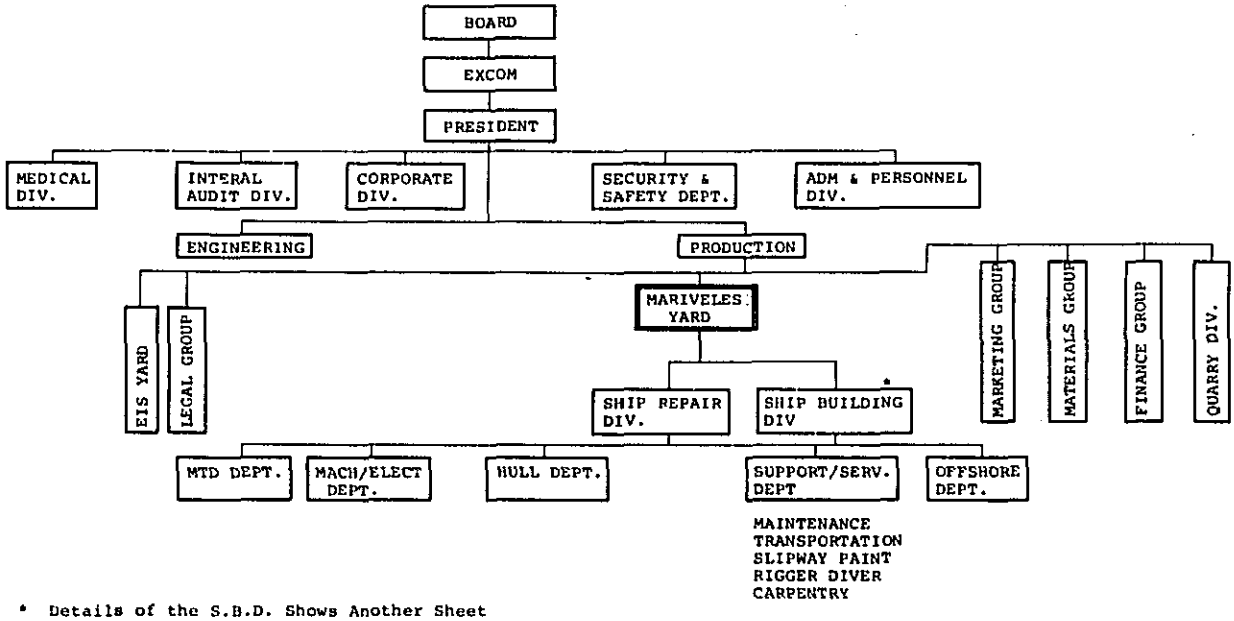
TYPE	PARTICULARS	DATES STARTED	DATES LAUNCHED	DATES DELIVERED	STEEL WTS	GROSS TONNAGE	MAIN ENGINE	OWNER
BARGE	110' x 30' x 9'	4 Oct 73		16 Nov 73	92			C D C P
BARGE	110' x 30' x 9'	22 Oct 73		27 Nov 73	92			C D C P
BARGE	120' x 30' x 9'	4 Feb 74		28 Mar 74	162			ASIATIC CORPORATION
TUG	46' x 39' - 6" x 13' - 6"	12 Dec 75		28 Mar 74	24		350 BHP	COASTWISE LITHERAGE
BARGE	110' x 32' x 9'	28 Feb 74		8 Apr 74	92			MINDANAO DEV. CORPORATION
	110' x 32' x 9'	6 Mar 74		6 Apr 74	92			MINDANAO DEV. CORPORATION
	110' x 30' x 9'	3 Mar 74		3 May 74	92			C D C P
	110' x 30' x 9'	27 Mar 74		29 Apr 74	92			C D C P
	110' x 30' x 9'	4 Apr 74		1 Jun 74	92			C D C P
	110' x 30' x 9'	16 Apr 74		31 May 74	92			C D C P
	110' x 32' x 10'	20 Mar 75	31 May 75	6 Jun 75	106	650 DWT		TRANSPORT COMMODITY CORPORATION
LIQUID BARGE	132' x 34' x 10'	15 May 75	9 Jul 75	16 Aug 75	134	750 DWT		REPUBLIC LITHERAGE CORPORATION
LIQUID BARGE	132' x 34' x 10'	18 Jun 75	2 Aug 75	2 Oct 75	134	750 DWT		REPUBLIC LITHERAGE CORPORATION
WATER BARGE	132' x 34' x 10'	18 Jun 75	9 May 75	26 Jul 75	168	875 DWT		PHILIPPINE NAVY
TANKER	222' x 52' x 12' - 3"	29 Mar 75	7 Oct 75	14 Sep 76	547	1180 GT	2 units 700 BHP	P N O C
	222' x 52' x 12' - 3"	1 Oct 75	15 Mar 75	19 Jan 77	556	1180 GT	2 units 700 BHP	P N O C
	222' x 52' x 12' - 3"	15 Dec 75	15 Jul 76	21 Jan 77	531	1180 GT	2 units 700 BHP	P N O C
TUG	56' - 6" x 16' x 5' - 7"	22 Jan 76		5 Jan 77	30.35	27 GT	2 units 380 BHP	BAY TRANSPORT
HOPPER BARGE	40' x 11' x 6'	21 Mar 76		6 May 76	17.5	23.76		D P W T C
	40' x 11' x 6'	23 Mar 76		3 Sep 76	17.5	23.76		D P W T C
	40' x 11' x 6'	25 Mar 76		20 Oct 76	17.5	23.76		D P W T C
	40' x 11' x 6'	26 Mar 76		21 Oct 76	17.5	23.76		D P W T C
	40' x 11' x 6'	26 Mar 76		25 Oct 76	17.5	23.76		D P W T C
	40' x 11' x 6'	28 Mar 76		28 Oct 76	17.5	23.76		D P W T C
	40' x 11' x 6'	29 Mar 76		25 Oct 76	17.5	23.76		D P W T C
HOPPER BARGE	40' x 11' x 6'	29 Mar 76		27 Oct 76	17.5	23.76		D P W T C
	40' x 11' x 6'	29 Mar 76		27 Oct 76	17.5	23.76		D P W T C
	40' x 11' x 6'	29 Mar 76		28 Oct 76	17.5	23.76		D P W T C
HOPPER BARGE	52' x 14' x 7'-6"	29 May 76		31 Aug 76	32	50		D P W T C
	52' x 14' x 7'-6"	30 May 76		2 Oct 76	32	50		D P W T C
	52' x 14' x 7'-6"	2 Jun 76		2 Oct 76	32	50		D P W T C
	52' x 14' x 7'-6"	2 Jun 76		2 Oct 76	32	50		D P W T C
BARGE	126' x 34' x 10'	16 Jul 76		22 Sep 76	116	386		TRANSPORT COM-
WORKBOAT	7.6M x 3.8M x 1.8M	22 Oct 76		30 Jun 77	13	6.5	2 - 100 HP	D P W T C
HATCH LOADING	132' x 34' x 10'	11 Jan 77		7 May 77	128.6			VULCAN & MINERAL IND. CORPORATION
	132' x 34' x 10'	13 Jan 77		23 Jun 77	129			VULCAN & MINERAL IND. CORPORATION

Steel used for construction
(Delivery base)

1973 :	2 vessels	184 tons	100 %
1974 :	8 vessels	738 tons	401 %
1975 :	4 vessels	542 tons	295 %
1976 :	17 vessels	966 tons	525 %
1977 :	6 vessels	1358 tons	738 %
(half)			

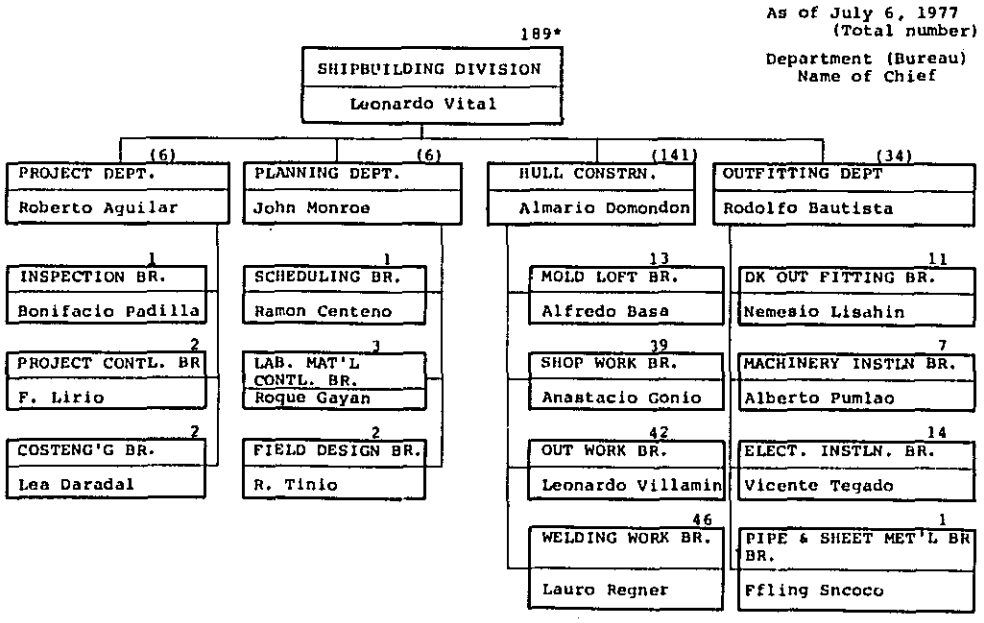
Fig. 6 BASECO ORGANIZATION CHART
(No. 1)

As of July 6, 1977



* Details of the S.B.D. Shows Another Sheet

Fig. 6 ORGANIZATION CHART FOR VESSEL CONSTRUCTION
(No. 2) AT BASECO MARIVELES



* If two vessels must be constructed at one time, about 100 workers (Monthly mean man-hours) will be available from Ship Repair Division and subcontractors.

Table 7 Table of Employees in Ship Building Division of BASECO

DEPARTMENT	BRANCH	TRADESMAN	Master and Supervisor M	Master and Supervisor S	Direct Worker REG.	Direct Worker JR	Direct Worker HELPER	TOTAL	TOTAL
Hull Construction	Manager							1	1
	Mold Loft	Foreman						1	
		Loftsman	1	4			7	12	
									13
	Outwork	Shipfitter	1	1		2	6	12	
		Gas Cutter		2	3	3	14	22	
		Chipper			2			2	
		Rigger		1		3	2	6	
									42
	Shopwork	Foreman						1	
		Asst Foreman						1	
		Shipfitter		3	4	1	18	26	
		Gas Cutter		1	1		1	3	
		Chipper		1	1		2	4	
		Blacksmith		1	1			2	
		Shot Blast Machine Operator			1			1	
		OHC Operator					1	1	
									39
	Welding	Foreman						1	
		Asst Foreman						1	
		Welder		4	15	13	12	44	
									46
Outfitting	Manager							1	1
	Machinery	Engineer						6	
									7
	Deck Outfitting	Shipfitter			2	1	6	8	
		Chipper					2	2	
		Drill Machine Optr			1			1	
									11
	Elect Instl'n	Engineer						1	
		Line man		1				1	
		Electrician					6	6	
		Field Electrician			2		1	3	
		Shop Electrician				1		1	
		OHC Operator					1	1	
		Ref & Air Con Mech					1	1	
									14
	Pipe & Sheet Metal	Engineer						1	1
	Manager							1	1
	Scheduling	Shop Planner				1		1	
									1
	Field Design	Engineer				1		1	
		Draftsman						1	
									2
	Labor & Mat'l	Statistician					1	1	
		Property Res. Person			1			1	
		Material Man			1			1	
									3
Project	Manager							1	1
	Inspection	Head						1	
									1
	Project Control	Engineer Cont				1	1	2	
									2
	Cost Engr'g	Engineer						1	
									1
SBD Office	Manager							1	1
		Secretary				1		1	
									1
GRAND TOTAL									189
					35	25	88		
					148				

Ratio of direct worker = 148/189x100=78.3 %

Table 8 Materials and Products Partly Available in the Republic According to the Conditions

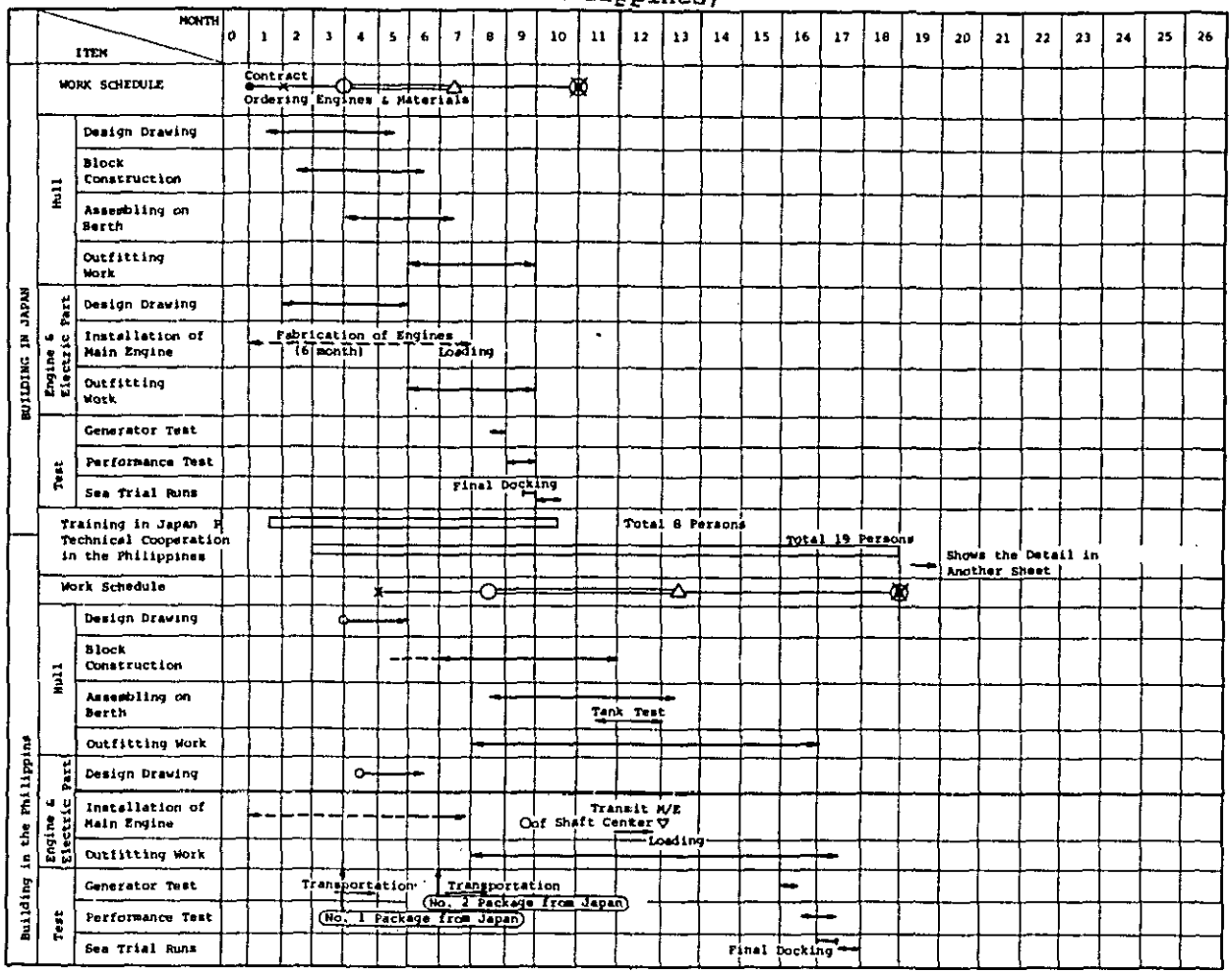
	Article	Remark
Major materials (Raw materials, miscellaneous materials)	Steel pipes (including STP)	Mainly SGP
	Flanges	5K and 10K
	Galvanized steel plates	
	Timber	Excluding plywood and decorated plywood complying with Fire-proof structure standards
	Oil type paints (general)	Excluding special paints, including primer
	Various welding rods (mainly cellulose)	
	Tile materials	
	Manila rope, nylon riggings	
	Oxygen, carbide	
	Canvas	Water-proof
Semi products	Furniture for accomodation	Locker, bed (board), wooden decorations, various wooden tables, etc.
	Semi products for outfitting	
	Ventilation duct	
	Various steel ladders and steps	Galvanization is possible
	Non water-tight or water-tight steel doors	Excluding special packings
	Skylight	Excluding built-in scuttle etc.

(Note)

(1) In principle, the materials not listed in the above table are to be imported from Japan. Materials of the same specifications should be ordered for the two ferry boats.

(2) Imported materials can be unloaded directly since BASECO Yard is a bonded area.
The wharf has one 45 ton x 26 m cargo handling crane.
Heavy articles exceeding 45 tons can be unloaded by a 80 ton crane to be completed at the end of this year.

Table 9 Work Schedule (Constructing in Japan and in the Republic of Philippines)



Note ● : Mould-loft starting

○ : Erection starting (i.e. keel laid)

△ : Launching

⊗ : Completion or delivery

× : Marking start

Table 10 Contents of the Technical Cooperation

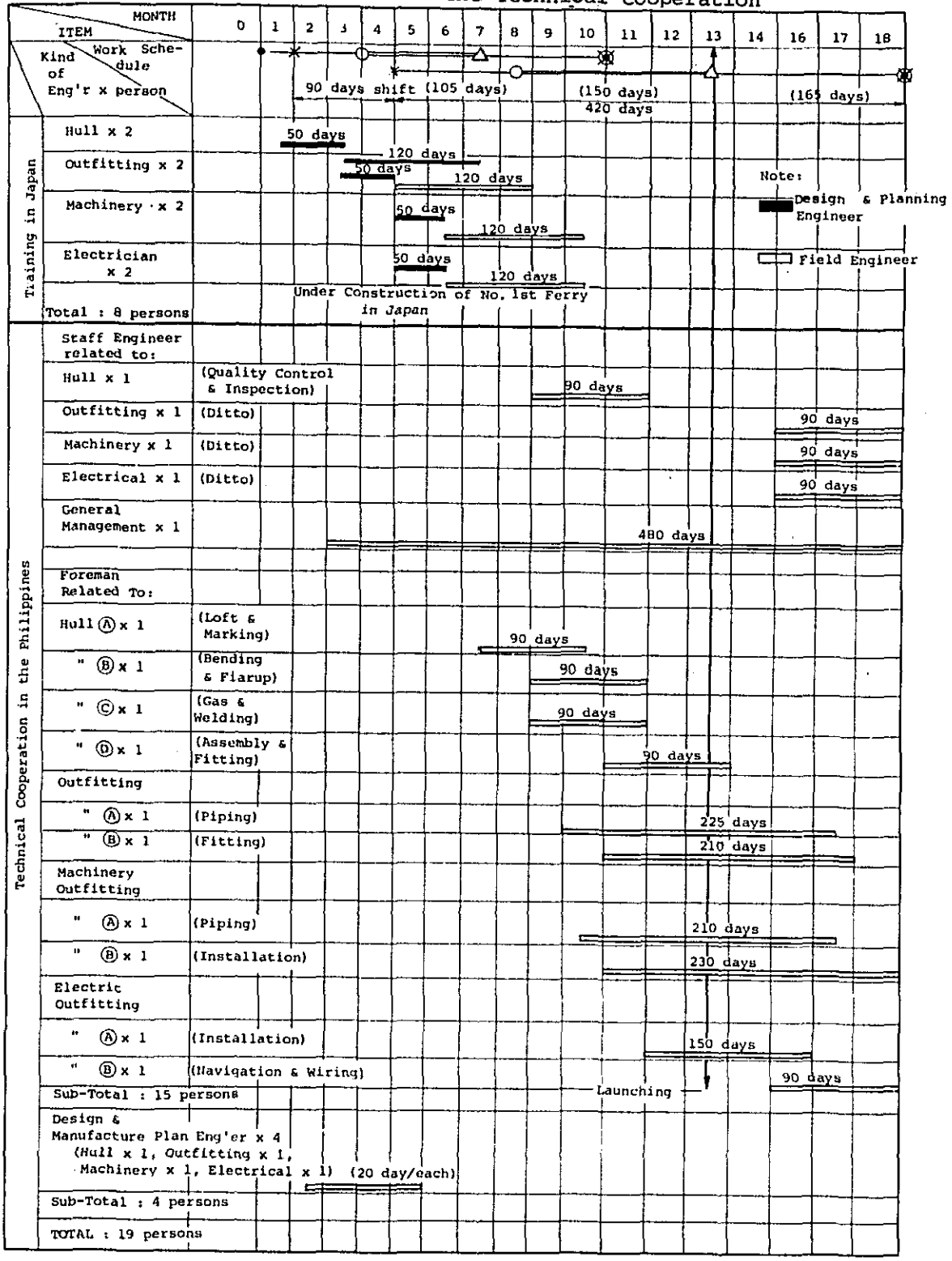


Table 11 Specifications of Estimated Consulting Fees

(In million yen)

	1st ferry (Japan)			2nd ferry (Philippine)			Total		
	Domestic currency	Foreign currency	Total	Domestic currency	Foreign currency	Total	Domestic currency	Foreign currency	Total
Personnel expenses (50,000 yen/day)	-	41.5	41.5	-	64.0	64.0	-	105.5	105.5
Travelling expenses (Two way trip between Tokyo and Manila: 200,000 yen)	-	1.6	1.6	-	2.4	2.4	-	4.0	4.0
Living expenses during stay in the Philippines (15,000 yen/day)	1.5	-	1.5	17.8	-	17.8	19.3	-	19.3
Living expenses during stay in Japan (15,000 yen/day)	-	9.2	9.2	-	1.3	1.3	-	10.5	10.5
Others (3% of total)	-	1.6	1.6	0.5	2.0	2.5	0.5	3.6	4.1
Total	1.5	53.9	55.4	18.3	69.7	88.0	19.8	123.6	143.4

Table 12 Estimated Costs of Ferry Construction

(In million yens)

	1st ferry (constructed in Japan)			2nd ferry (constructed in the Philippines)			Total		
	Domestic currency	Foreign currency	Total	Domestic currency	Foreign currency	Total	Domestic currency	Foreign currency	Total
Materials	-	688.2	688.2	-	781.0 [4)]	781.0	-	1,469.2	1,469.2
Indirect expense 2)	-	323.8	323.8	204.0	-	204.0	204.0	323.8	527.8
Direct expenses	-	129.0	129.0	120.0	-	120.0	120.0	129.0	249.0
Designing fee	-	56.0	56.0	-	-	-	-	56.0	56.0
Engineering fee	-	-	-	35.9	128.0	163.9	35.9	128.0	163.9
General management cost 3)	-	155.6	155.6	165.0	-	165.0	165.0	155.6	320.6
Total vessel cost									
(in peso) 4)	-	1,352.6	1,352.6	524.9	909.0	1,433.9	524.9	2,261.6	2,786.5
	-	(36.3)	(36.3)	(14.1)	(24.4)	(38.5)	(14.1)	(60.7)	(74.8)
(in dollar) 4)	-	(5.01)	(5.01)	(1.94)	(3.37)	(5.31)	(1.94)	(8.38)	(10.32)
Consulting fee	1.5	53.9	55.4	18.3	69.7	88.0	19.8	123.6	143.4
Cost for bringing ferry to the Republic	-	9.0	9.0	-	-	-	-	9.0	9.0
Total 1)									
(in peso)	1.5	1,415.5	1,417.0	543.2	978.7	1,521.9	544.7	2,394.2	2,938.9
	(0)	(38.0)	(38.0)	(14.6)	(26.3)	(40.9)	(14.6)	(64.3)	(78.9)
(in dollar)	(0)	(5.24)	(5.24)	(2.01)	(3.62)	(5.63)	(2.01)	(8.86)	(10.87)

Note) 1) It was assumed that the 1st ferry should be delivered in the middle of 1979 and the 2nd ferry at the end of the same year.
2) Work hours: 130,000 hours (1st ferry), 560,000 hours (2nd ferry)
Unit price of manhour : 2,500 yen (1st ferry), 360 yen (2nd ferry)
3) 13% of manufacturing cost
4) 1 dollar = 270 yen = 7.25 pesos was assumed. In million pesos or in million dollar.