On the cant portion of the stern, we have provided a ramp for skiff; during the voyage, the boat can be recovered via this ramp. In addition, in the interest of operating convenience, a wooden grating will be laid on the upper deck section, excluding the cant portion, but including the section above the engine room opening in the center of the vessel, so that fishing operations will not be encumbered by projecting portions on the upper deck.

The net storage area on the vessel, including attached gear, has been set at about $18m^2$.

With regard to freshness retention for the catch, the method of circulating refrigerated seawater by means of a small refrigeration machine should be considered. The ceiling and floor of the fish hold and surrounding walls will all be thermally insulated with urethane foam to prevent heat penetration from the outside. The inside surface of the hold will be of watertight construction, lined with FRP.

4) Engine Room:

The engine room will house the main engine, generator, and auxiliary engines as well as the power distribution board and battery room. However, these items will naturally be arranged in such a way as to facilitate normal operations and not hinder regular equipment checks and maintenance. The area will be suitable for these purposes and will not give rise to any incidental construction work in connection with repairs.

3.3.3 Training Equipment:

The items and quantity of training equipment are shown in detail in Section 4.3.4 and in Appendix V-5.

3.4 Maintenance and Operation Costs

The maintenance and operation costs will comprise the expenses for the operation and maintenance of the facilities, training vessel and equipment, salaries for staff, and other variable costs required for the

institute's activities. The conditions and the unit rate for calculation of the maintenance and operation costs are as follows.

Trainee Days on Premises	300 days/year
Operation Days of Training Facilities	280 days/year
Operation Days of Training Vessel	120 days/year (5-day/trip x 24 trips/year)
Electricity Rate	M$0.24/kwh
Water	M$0.55/$m^3$
LPG	M$1.2/kg
Diesel Oil	M$500/kl

3.4.1 Operational Expenses

(1) Building Facility (including equipment)

1) Electricity

Admi./Training Building			
Administration Block;	234kwh/day x 300 days	=	70,200kwh/year
Training Block;	122kwh/day x 280 days	=	34,160kwh/year
Hostel	46kwh/day x 300 days	=	13,800kwh/year
Dining Hall	46kwh/day x 300 days	=	13,800kwh/year
Processing Building	91kwh/day x 280 days	=	25,480kwh/year
Net Loft	9kwh/day x 280 days	=	2,520kwh/year
Engine Workshop	16kwh/day x 280 days	=	4,480kwh/year
Gymnasium, etc.			15,690kwh/year
		Total	180,130kwh/year

180,130kwh/year x M$0.24 = M$43,231/year.....(1)

2) Water

Admi./Training Building			
Administration Block;	$5.5m^3$/day x 300 days	=	$1,650m^3$ /year
Training Block;	$13.5m^3$/day x 280 days	=	$3,780m^3$ /year
Hostel	$27.54m^3$/day x 300 days	=	$8,262m^3$ /year

Dining Hall	6.55m^3/day x 300 days =	1,965m^3 /year
Processing Building	2.0m^3/day x 280 days =	560m^3 /year
Other facilities		112m^3 /year
	Total	16,217m^3 /year

16,217m^3 /year x M$0.55 = M$8,919/year.....(2)

3) LPG

Processing Bldg. and other facilities 350kg/year

350kg/year x M$1.2 = M$420/year.....(3)

(1) + (2) + (3) = M$52,570/year

(2) Training Vessel

1) Diesel Oil

The expected number of trips is 24 per year with 5 days per trip. The total mileage per voyage is estimated at 400 nautical miles with the cruising speed of 10 knots. The fuel consumption rate is calculated at 155gr/ps.hr with output of the main engine at 610ps. As for the auxiliary engine, the average output is estimated at 50ps with the fuel consumption rate of 180gr/ps.hr and the total service time per voyage set at 120 hours.

Main engine 155gr/ps.hr x 40hrs x 610ps = 3,782kg

Aux. engine 180gr/ps.hr x 120hrs x 50ps = 1,080kg

Total 4,862kg/trip

4,862kg/trip x 24 trips/year = 116,688kg

116,688kg / 0.85 = 137,280kl

137,280kl x M$500 = M$68,640/year.....(1)

2) Lub. Oil

Expense of lubricating oil is estimated at 10% of the fuel cost.

M$68,640 x 0.1 = M$6,864/year.....(2)

(1) + (2) = M$75,480/year

3.4.2 Maintenance Cost

(1) Facility

The maintenance cost for the facility has been derived from the maintenance budget for the existing facilities in Penang and Terengganu, and it is estimated that the same level of cost would be incurred for the new facility, or M$35,000/year.

(2) Equipment

The budget for this item will be used for procurement of spare parts and expendable materials of the training equipment under the Project. Based on the past records of the existing facilities, the total maintenance cost is estimated at M$150,000/year for the equipment.

(3) Training Vessel

The maintenance budget for the training vessels has been appropriated from the budget of the Department of Fisheries and not from that of the institute. However, the estimated maintenance cost for the new training vessel has been set at M$85,000/year, the figure equivalent to 3% of the of the machinery to be fitted on the training vessel.

3.4.3 Salary for Staff

The budget for this item has been estimated from the past records at the two existing facilities and set at one million M$/year, a level about 10% less than the present figure, taking into account the fact that some redundancy in personnel assignments can be eliminated by the integration of the existing two facilities.

3.4.4 Other Expenses

The activities in the new institute will involve travel expenses for staff, various allowances for trainees which are appropriated under the Development Expenditures, and procurement of new equipment or services. These expenses will be at the same level as the present ones, or

M$700,000/year, as the new institute will in principle take over the existing training activities conducted in Penang and Terengganu.

The following table summarizes the annual expenditures expected at the new institute.

	Operation Cost	Maintenance Cost	Salaries	Other Expenses
Facility	52,570	35,000	1,000,000	700,000
Equipment	--	150,000		
Training Vessel	75,480	85,000		
Total	128,050	270,000	1,000,000	700,000

For the past three years from 1987-89, the ILPM Penang and Terengganu have been securing altogether the average annual budget of M$1.1 million for salaries, M$50,000 for operations including utility charges, M$209,000 for spare parts and repair charges, M$340,000 for travel and transport, and M$457,000 for allowances for trainees. The Department of Fisheries can secure the budget at the existing level which can be readily allocated for the operation of the new institute and no problems are expected in this regard.

3.5 Technical Cooperation:

In the target Project, the Malaysian Government has requested the dispatch of specialists to provide guidance in development for the training program.

Japan has a network of 40 fisheries high schools for fishery studies which provide specialized training in this area, and these schools have a long history of developing fishery specialists. From this standpoint, if instructors from these schools, with rich experience in fishery education, could cooperate in the implementation of the target Project, the benefits therefrom would surely be further increased. However, it should be noted that our fishery high schools offer courses of 3 years to students who have completed their 9 years of compulsory education and, in

addition to specialized subjects, also offer general subjects such as Japanese language, English, civics, and fine arts. But the Fishery Training Institute to be established under this Project is mainly oriented to practical training directed at fishermen. Thus, there is a major difference between the two programs.

Accordingly, in our judgment, the area in which Japanese specialists could most effectively collaborate in the implementation of the Project is not the development of optimum programs for Malaysian fishermen but rather in suggesting the levels at which to target the instruction as well as the most effective training methods to achieve these goals. The educational policies of the Malaysian Government lay great emphasis on manpower training programs in the fields of science and technology and management and, in view of the great interest that Malaysia has shown in Japan's educational system, we have concluded that there is certainly a need for technical cooperation via the dispatch of specialists.

With respect to the training vessel, since this is to be of the purse-seine type, considerable benefits could be anticipated from offering training courses to instructors at the new institute in the practical aspects of purse-seine and winch operations. In addition, through training programs on the existing trawl-type training vessels, comprehensive training could be provided also on trawl winch operations. If trainers could be dispatched to the new purse-seine vessel for six months to a year following delivery, training could be offered to most of the persons concerned with the on-vessel programs, and major benefits could be expected in the areas of purse-seine winch operations and net laying and hauling. From this standpoint, there would appear to be a considerable need for dispatching purse-seine trainers from Japan, and the potential benefits from such a program would be significant.

CHAPTER FOUR: BASIC DESIGN

4.1 Basic Policy:

The target Project is intended to strengthen the fishery training system in Malaysia as a foundation of that country's fishery development program, with a view to raising technical standards among fishermen and staff of the Department of Fisheries and training crews for the offshore fishery. The basic thinking behind the Project is to improve the effectiveness of the training program now being offered at the existing Fisheries Training Institute in Penang and Terengganu, while making the programs more responsive to the needs of the fishing industry.

Accordingly, the Project facilities will essentially take over the well functioning aspects of the programs at the existing facilities while adding required new course material. To insure a harmonious blend with the surrounding environment, the Project facilities have been designed in consideration of the natural conditions of the Project site and social conditions in the country, including those in the fishing industry and other industries in the area.

In preparing the Project, we have utilized structures, materials, and construction methods that reflect local building conditions, and have attempted to employ local labor, materials, and construction equipment to the maximum extent possible with a view to contributing to the local economy.

4.2 Consideration of Design Conditions:

4.2.1 Natural Conditions

Peninsular Malaysia is located almost entirely between 2-7^{O} N. latitude and, facing the Indian Ocean and the South China Sea, is subject to the Asian monsoons. The east coast is particularly strongly affected by the northeast seasonal winds from November to February, and, during this period, receives considerable rainfall, while the rough seas prevent operations by small fishing vessels. However, the agitation of the water creates favorable conditions for fish production. During the southwest

monsoons, there is virtually no influence from seasonal winds, while rainfall is sporadic.

Following is a brief description of the meteorological and soil quality conditions in the Project area. The weather data analysis is based on observations for 1968-1988 at the Kuala Terengganu Weather Station (5^{0} 20' N, 103^{o} 08'E, 35.1 m elevation), while the soil condition data are based on boring surveys at the site.

(1) Wind Direction:

As shown in Figure 4.1, the prevailing winds are from the southwest and northwest during the southwest monsoon season (April-October) and the northeast monsoons (November-March), followed by easterly and southerly winds.

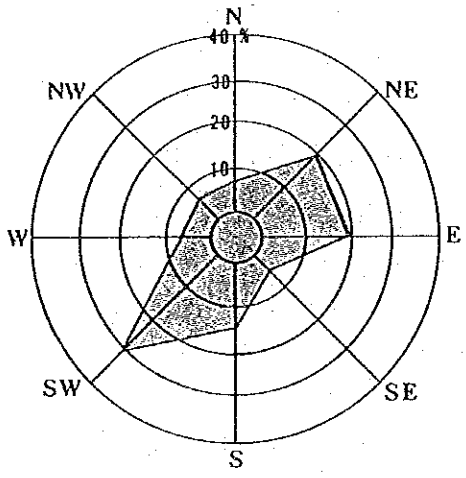


Figure 4.1 Wind Direction Frequency

(2) Wind Velocity:

Figure 4.2 shows average and peak wind velocity by month. Average velocity is low throughout the year-- 3.2 m/s during the northeast monsoons from November to March and 2-3 m/s during the southwest monsoons from April to October. Annual average velocity is 2.9 m/s. Peak monthly velocities are in the range of 15-20 m/s. The average peak velocity

during the summer southwest monsoons is somewhat higher than during the northeast monsoon period.

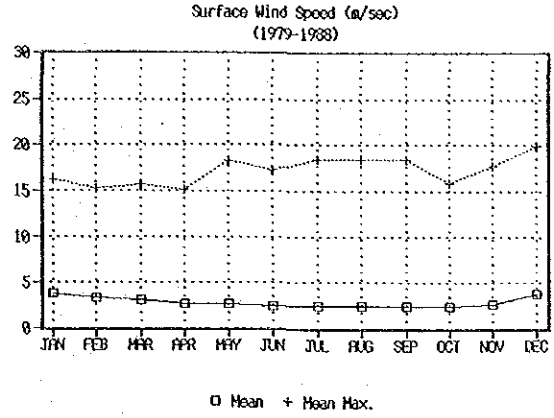


Figure 4.2 Distribution of Wind Velocities

(3) Rainfall:

The area is one of heavy rainfall, with average annual precipitation over the 10 year period 1979-1988 at 3,067.3 mm. The months with the heaviest rainfall are November and December (650-650 mm), which account for some 40% of the annual total. The average in the other months is below 100 mm per month, with rainfall particularly low in January and February. Over this 10-year period, an unusually high rainfall of 1,600 mm was recorded for November 1988. Rainfall data are given in Figure 4.3.

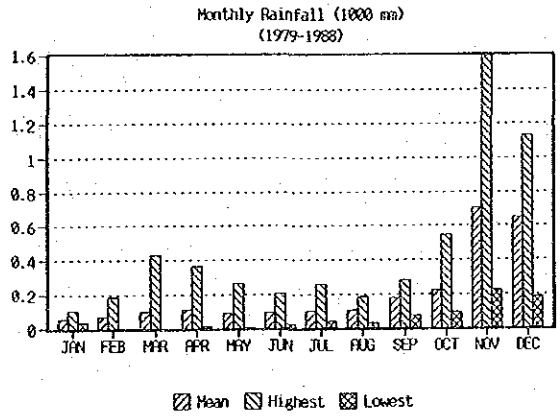


Figure 4.3 Monthly Rainfall

(4) Number of Days with Rain:

Reflecting the rainfall patterns, the months with the largest number of rainy days are November and December, at 22.8 and 23.1 days respectively. From February-July, the number is relatively low, ranging between 8.8 and 11.6 days (roughly 1/3 of the month).

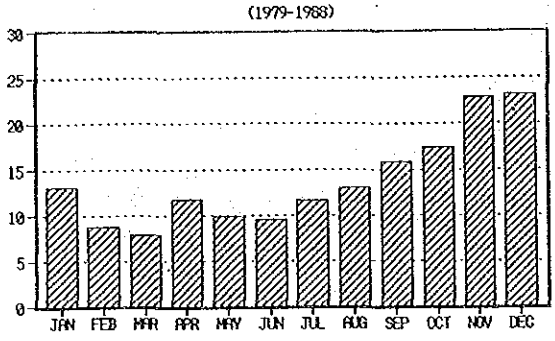


Figure 4.4 Number of Rainy Days per Month

(5) Temperatures:

Average monthly temperatures are shown in Figure 4.5. According to this chart, the range of average monthly temperatures is between 25.1 -27.3°C, with very little variation by month. Summer temperatures are only about 2 degrees higher than in winter.

The average daily high for the year is 30.3°C. and the low 22.9°C., with a maximum daily temperature of 35.1°C and a minimum of 18.4°C. The peak temperatures occur in May and June, the lows between January and March.

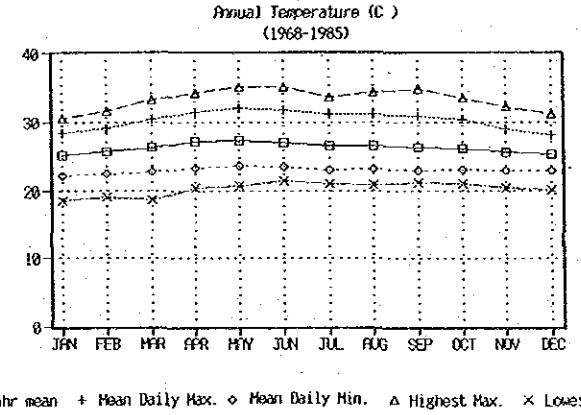


Figure 4.5 Average Monthly Temperatures

(6) Humidity:

Monthly humidity data are given in Figure 4.6. The area is characterized by high humidity throughout the year, with a monthly average of 80-90% and little monthly variation. The annual average is 85.5%. Average daily high and low humidity over the year is 97.8% and 67.7% respectively. The lowest humidities occur during periods of shore winds during the southwest monsoon season.

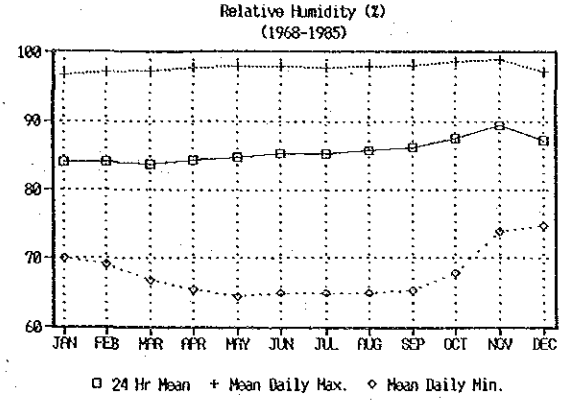


Figure 4.6 Monthly Humidity

(7) Soil Conditions

Figure 4.7 provides an estimated soil layer section, based on the results of the soil survey. The soil layers at the planned construction site are composed of fill materials as the surface section, followed by sand, marine clay, and weathered rock as the bedrock.

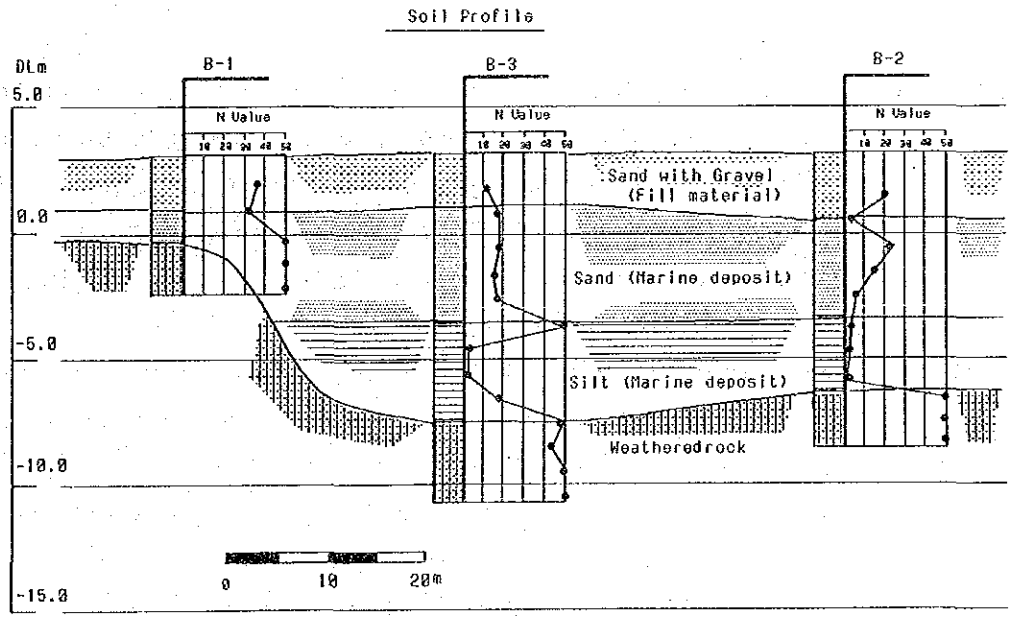


Figure 4.7 Estimated Soil Layer Section

The fill material is composed of relatively well-graded sand, with N values ranging from 10-40, based on standard penetration tests which indicate relative density (or hardness) of soil, and is considered a relatively good foundation as fill material.

Below the fill material, there is a coastal deposit 4-5 m thick, made up of former ocean bottom. This layer is composed of fine sand, with an N-value distribution of 10-20 and has a medium relative density.

Beneath the sand layer is a clay deposit 4-5 m thick which, like the sand layer above, is assumed to be an alluvial marine deposit, and has low N values of 1-3. When deposits of alluvial marine clay occur, there is generally a problem with consolidation settlement caused by the load from landfill. However, in view of the thinness of the soft layer which is the focus of the consolidation settlement at the subject site, it is presumed that the consolidation settlement from landfill was already completed at a relatively earlier date. In addition, since the soft layer is distributed over a relatively deep area of about GL-7m, it was concluded that, with a small-scale foundation, the load will be well distributed, obviating problems from insufficient bearing strength.

4.2.2 Infrastructure

(1) Power:

In Peninsular Malaysia, electric power is provided by the National Electricity Board. The peninsula is served by a high-power transmission grid belt of 275 kv, with power supply quite stable. Long-distance power is transmitted at 132 kv and stepped down to 115 kv at primary sub-stations. In Terengganu State, there are 3 primary sub-stations, with Chendering, the Project area, served by the Bukit Besar Station. In the case of general office buildings and factories, which are planned to use no more than 1,000kw, it will be necessary for the user to further step down the incoming power from 11 kv to 415 v. The 11 kv lines are underground and, while power outages may occur as a result of cable cut accidents, due to careless excavation, based on the completion of the national distribution grid, no shortages are anticipated in power supply

at the Project site. The usage voltage at the Project area will be as follows:

High voltage	11 kv	50 Hz, 3-phase, 3-wire
Low voltage	415 v	50 Hz, 3-phase, 4-wire
	240 v	50 Hz, single-phase, 4-wire

(2) Water Supply:

In Chendering, raw water is collected from the Terengganu River and pressure fed to storage tanks via water filtration stations, and drinking water meeting WHO standards is supplied to each terminal. At the Project site, water will be distributed via a 6-inch pipe from a water tank of 4,500 m^3 capacity, located about 1.6 km away at an altitude of about 60 m, to an overhead water tank used by the fishing port facilities, and will be branched from this pipe to the Project facilities. Since water supply is abundant, there need be no fear of depletion.

(3) Sewerage:

There is no sewerage system in Malaysia outside the large cities, such as Kuala Lumpur and Penang. Thus, at the Project site, it will be necessary to provide drainage through the construction of an individual sewage disposal tank.

(4) Gas:

While there is no municipal gas system, LPG is widely available, and so gas will be supplied from individual gas cylinders.

4.2.3 Applicable Standards

(1) Structural Design

The applicable structural standards in Malaysia are stipulated in the Uniform Building By-Laws, 1984, whose contents conform to such British laws as BS and BSCP. Unit weight of materials, bearing loads, and wall base width by soil type are all quantitatively specified. In addition,

there are both general provisions and provisions under the governing BS and BSCP.

(2) Fixed loads

Fixed loads were computed on the basis of the weights of the structural and finishing materials and other building conditions. We have specified the following fixed loads for the main materials according to By-law 56:

Sand	2,039kg/m^3
Gravel	1,937kg/m^3
Concrete	2,310kg/m^3
R-bars	7,859kg/m^3
Brick	1,920kg/m^3
Wood	800 - 1,120kg/m^3
Roofing tiles	59kg/m^2

(3) Bearing loads

The bearing loads have been determined as follows on the basis of the types and intended uses of the facilities:

Roof	26kg/m^2
Office	255kg/m^2
Training rooms	306kg/m^2
Classrooms	306kg/m^2
Gymnasium	367kg/m^2
Dining room	204kg/m^2
Kitchen	306kg/m^2
Hostel	153kg/m^2
Corridors, balconies	Same values as the rooms they connect

(4) Seismic strength

Since no earthquakes have ever been recorded in Malaysia, seismic loads are not even specified in the country's construction laws and regulations, nor is consideration given to seismic loads even at the

stage of construction design. Accordingly, we have not considered seismic loads in connection with the structural plan.

(5) Wind loads

Although the Project area is subject to the influence of the prevailing southwest winds from April-October and northeast winds from November-March, it is located in a virtually cyclone-free zone. Based on data from the Kuala Terengganu Weather Station, average peak wind velocity has never exceeded 20 m over the past 15 years.

Wind loads have therefore been considered in accordance with the stipulations in Chap. V, BSCP 3, to which the local structure is designed.

4.3 Basic Plan:

4.3.1 Site and Layout Plan:

(1) Basic Considerations:

The Project site has an area of 25,000 m^2 and is comprised of a north section, fronting on the approach road, and a south section, separated from the western perimeter by a steep hill.The layout plan for the facilities was based on the following considerations:

1) The layout plan was developed based on the particular functions of the subject facilities, with due regard to their separate characteristics and organic inter-relationships.

2) Since the facilities must be laid out within a confined area, we have attempted to achieve effective utilization of the Project site by dispersing the facilities over the entire area and clustering key elements so as to maintain their functional independence.

3) The climate in the Project area is that of a typical humid tropical area with high temperatures, humidity, and rainfall. The Plan gives

full consideration to the various natural conditions such as the low angle of strong sunlight during the morning and evening and the prevailing northeast and southwest winds over the course of the year.

4) The facilities have been separated to the maximum possible degree from the fishing port adjoining the southwest side of the Project site. The layout has given consideration to preserving a favorable environment after completion of the facilities through landscaping and other improvements.

(2) The Layout Plan:

1) Admi./Training Building:

This building is to be comprised of an Administration Block and a Training Block.

The Administration Block includes various rooms that support the training activities and will become the gateway facility for both trainees and visitors. Since a constant stream of visitors is expected, this block has been located on the eastern side of the north perimeter to facilitate access from the access road.

The Training Block will be the core facility in the Project and will be comprised of general classrooms, a chart room, and a navigation room for courses directed mainly at resident trainees.

To avoid a clash between the activity flows of visitors and trainees, and with a view to its connection to the other training facilities, the Administration Block has been positioned on the west side of the site. Considering the natural conditions in the area, the longitudinal axis of the building has been positioned in an east-west direction so as to avoid the strong sun in the morning and evening and ensure proper ventilation, based on the prevailing northeast and southwest winds.

2) The Hostel:

This building will contain private living space for resident trainees and so will have to be independent of the other facilities and in a quiet setting. As the southern part of the Project site borders on a steep hill to the west, this would presumably be the area that offers the quietest environment in the site. After considering particularly the location of the ice plant in the Chendering fishing port on the eastern perimeter, we have located the Hostel as far to the west as possible.

The longitudinal axis for the main parts of the Hostel building has been positioned in an east-west direction out of consideration for sunlight, ventilation, and other natural conditions.

3) The Dining Hall:

Since this facility is to be attached to the Hostel, it is desirable that it be located adjacent to this Hostel. The Dining Hall will serve as a buffer facility between the ice plant, which is a major source of noise, and the Hostel and is to be located on the southwest side of the Project site.

4) Other Training Facilities:

It is desirable that the Gymnasium, Processing Building, Net Loft, Engine Workshop, Maintenance Shop, and other training facilities be placed alongside the Admi./Training Building, owing to their strong functional relationships. Accordingly, these facilities will be grouped around the Admi./Training Building from the northwest to the south side of the site, taking into account such factors as functional inter-relationships, use frequency, and ease of access.

5) Parking Space and Other Elements:

Parking space has been provided in a corner area on the east side of the Admi./Training Building as an extension of the activity flow line from the approach road. A sub-access road will be built from the northern perimeter to the Admi./Training Building and the Hostel, with another access road to be provided to the shore as a continuation of this flow line.

The main facilities will be connected by a covered corridor to give protection against rain and sunlight.

Following is an outline of the zoning plan for the facility layout, based on the above considerations:

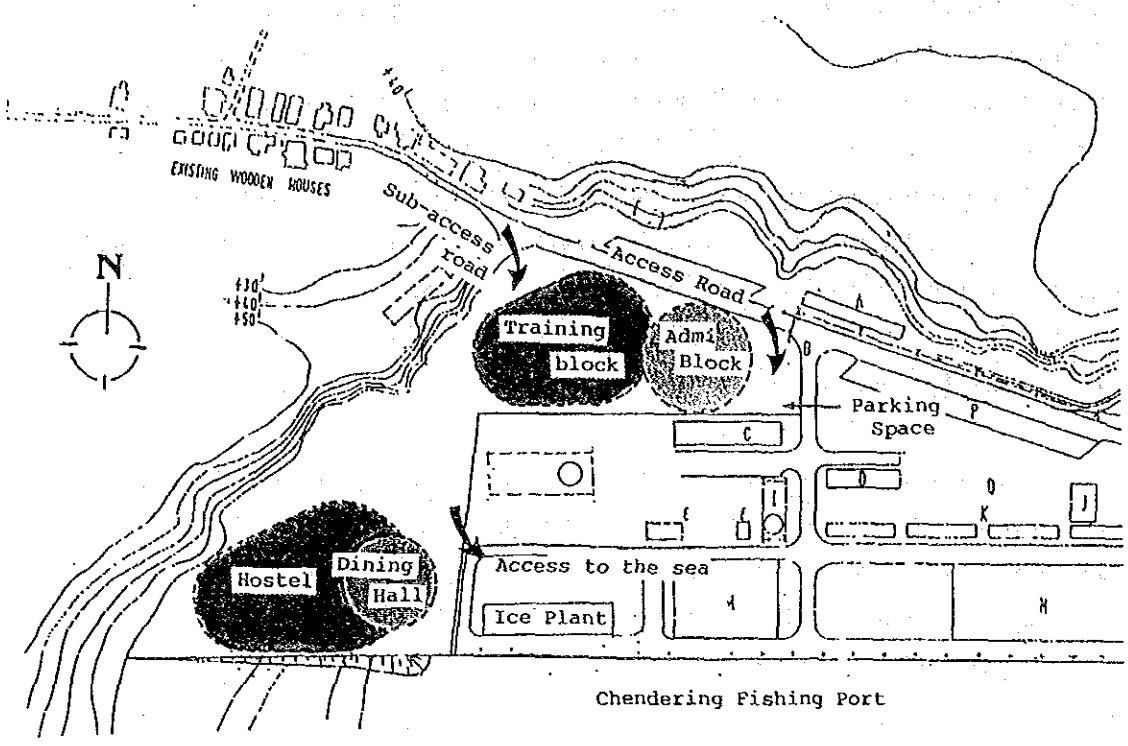


Figure 4.8 Zoning Plan

4.3.2 The Building Plan:

(1) The Floor Plan:

1) Admi./Training Building:

The functions of this facility will be divided between administration and training, with a requirement for more than 30 rooms. From the standpoint of effective utilization of the limited area, we feel it will be necessary to concentrate the facilities on the basis of multi-storied construction. However, considering that there will be frequent trainee movement to facilities outside this building, and with a view toward the surrounding environment, it will not be desirable for the building to exceed 2 stories. Accordingly, the room layout for this structure has been based, in principle, on a 2-story structure providing

organic linkage between the various rooms as well as independent functioning of the facility. The plan, however, calls for 3-story construction in certain parts of the structure, as required.

The Administration Block is located on the south of the property and the Training Block on the north. The 2 blocks will be linked by a Service Block, incorporating an entrance hall, stairs, and connecting corridors. The room layout plan utilizes an open-sided corridor to optimize lighting and ventilation.

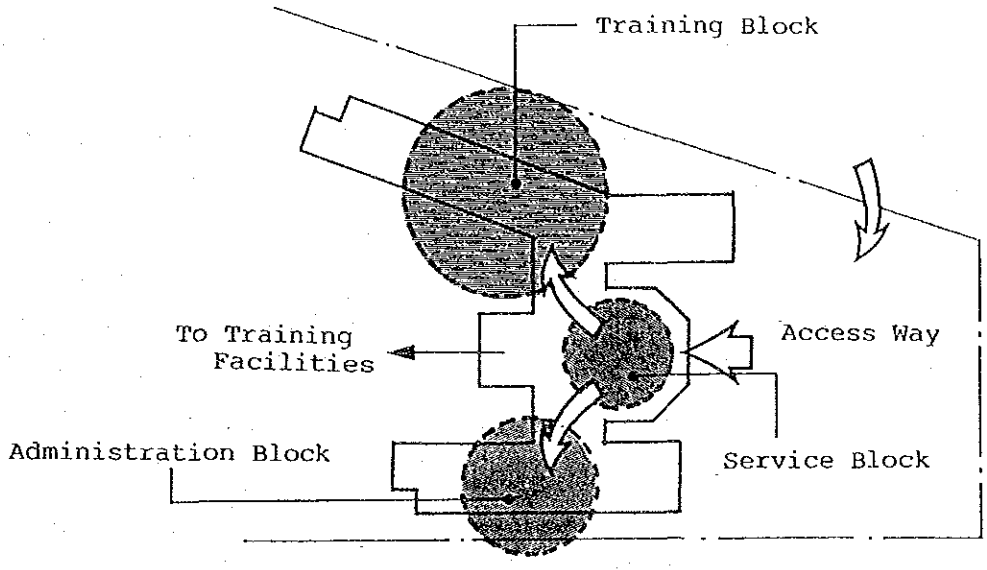


Fig. 4.9 Block Plan for Admi./Training Bldg.

a) Administration Block:

With a view to visitor access, the first floor will contain the general office, offices of the Director, Deputy Director, and Secretary, one of the instructors' rooms, a lounge, and toilets; the second floor will contain the other instructors' room, a conference room, a printing room, storage room, and toilets.

b) Training Block:

The first floor will contain part of the administrative area, including the library and vessel officers' room, together with classrooms, navigational training room, and the chart training room. The classroom complex dedicated mainly to lectures is to be located on all 3 floors.

The area of the Admi./Training Building, as calculated from the floor plan, will be 1,683.875 m^2.

2) Hostel:

This facility will comprise 2 blocks: a Residential Block and a Service Block, with a requirement for over 50 rooms. As in the case of the Admi./Training Building, the building area will be reduced, through multi-story construction, to permit the most effective use of the Project site but, since the Hostel is to be a private living area, and in view of the obvious need for a relaxing living environment, we have decided that a 2-story structure would be desirable. Accordingly, the Hostel will be a 2-story building, with the room layout planned to ensure the independence of the residential function.

The room composition in the Residential Block will consist of bedrooms for use by long-term trainees, short-term trainees, government officials, and visiting instructors, together with service facilities. The various living zones will be separated by each other to ensure privacy.

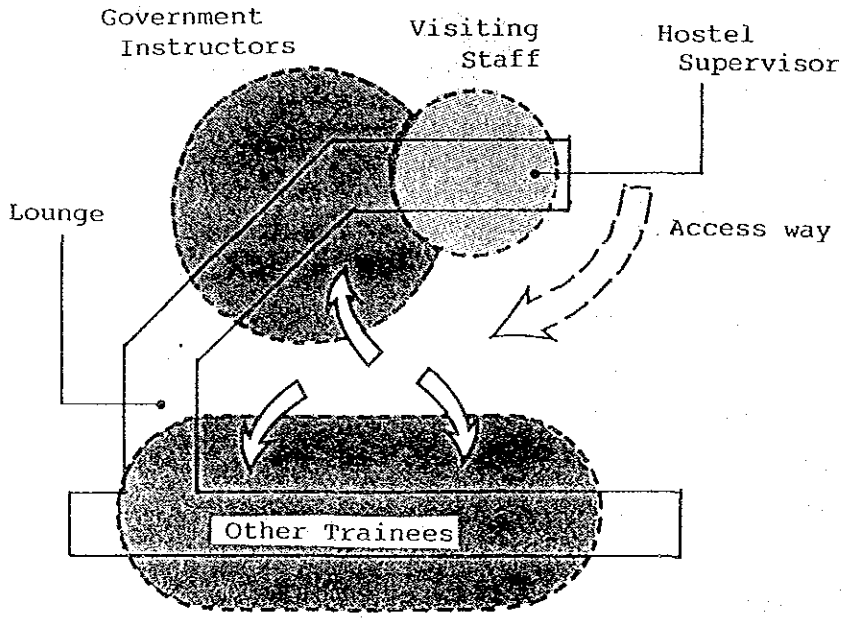


Fig. 4.10 Hostel Block Plan

The service rooms -- toilets and showers, laundry rooms, and storage areas -- have been dispersed on the basis of their service scope. The Hostel supervisor's quarters in the Service Block have been located on

the first floor at the northern edge of the building to permit visual monitoring of incoming and outgoing traffic. The lounges will be situated in the center of the facility, on both the 1st and 2nd floors. We have adopted an open-sided corridor plan for the bedroom layout in order to maximize sunlight and ventilation.

The area for the Hostel facility, as calculated from the above floor plans, will be 2,129.25 m^2.

3) The Dining Hall:

The rooms making up the Dining Hall will include a dining room, kitchen, staff room, pantry, and toilet. This facility has been positioned in such manner that it will be enclosed on three sides by the Hostel. The dining room has been located on the western side, for ease of access from the Hostel. With the dining room as the focus, the kitchen and adjoining pantry have been placed on the east side of the facility for ease of food deliveries and waste disposal in a way that will prevent any crossing between the food delivery flow line and that of the dining room users. The dining room toilet and staff room have been placed on the south side of the Dining Hall.

The area of the Dining Hall facility, as calculated from the above floor plan, will be 392.00 m^2.

4) Other Training Facilities:

The other training facilities have all been positioned with primary reference to the principal training rooms; i.e., the laboratory as an adjunct to the Processing Building and the storage areas as adjuncts to the Net Loft, Engine Workshop, Maintenance Shop, and Gymnasium. The following points were considered in developing the floor plans:

--- Careful consideration was given in all cases to ventilation. The position and size of openings in facilities likely to produce odors or noise were planned with a view to preserving the environment.

--- The flow lines into adjunct facilities for the receipt and dispatch of equipment and teaching materials have been planned so as not to hinder training activities.

--- Interior illuminance has been designed to utilize natural lighting to the maximum possible extent.

The required scope of the various facilities, as derived from the above floor and layout plans, is shown below.

Admi./Training Building:

Training Block:

General Classrooms:

Navigation Course	42.25m^2	1
Navigation Modular Course	42.25m^2	1
Engine Course	42.25m^2	1
Engine Modular Course	42.25m^2	1
Deep-Sea Fishery Course	52.00m^2 x 4	4
Induction Course	52.00m^2	1
Fishing Gear Technology Course	42.25m^2	1
Sub-total	471.25m^2	

Special Classrooms:

Navigation room	81.00m^2	1
Library	84.50m^2	1
Chart room	84.50m^2	1
Sub-total	250.00m^2	

Administration Block:

Office of the Director	26.00m^2	1
Office of the Deputy Director	16.00m^2	1
Secretary's office	10.00m^2	1
Office Manager's office		
General office	84.50m^2	1
Instructors' room	52.00m^2 x 4	4
AVA room	26.00m^2	1
Vessel officers' room	42.25m^2	1
Conference room	63.375m^2	1

Printing room	21.125m^2	1
Dressing room	21.125m^2	1
Toilets	21.125m^2 x 4	4
Sub-total	616.625m^2	

Service Area:

Corridors and entrance hall	350.000m^2	

Total of Admi./Training Building 1,683.875m^2

Processing Building:

Processing room	100.00m^2	1
Laboratory	60.00m^2	1
Total of Processing Building	160.00m^2	

Net Loft:

Net training area	300.00m^2	1
Fishing gear repair room	70.00m^2	1
Fishing gear store	70.00m^2	1
Net store	49.00m^2	1
Toilet	21.00m^2	1
Total of Net Loft	510.00m^2	

Engine Workshop:

Engine training room	153.00m^2	1
Tool store	13.50m^2	1
Parts store	13.50m^2	1
Total of Engine Workshop	180.00m^2	

Maintenance Shop:

Parts maintenance room	36.00m^2	1
Metal workshop	36.00m^2	1
Parts store	18.00m^2	1
Total of Maintenance Shop	90.00m^2	

Gymnasium:

Workout area	400.00m^2	1
Store and stage	60.00m^2	-

Changing room/Toilets	$30.00m^2$	1
Total of Gymnasium	$490.00m^2$	

Hostel:

Residential Block:

Bedrooms for long-term trainees	$33.00m^2$ x 25	25
Bedrooms for short-term trainees	$33.00m^2$ x 2	2
Bedrooms for short-term trainees	$48.00m^2$ x 2	2
Bedrooms for government trainees	$24.00m^2$ x 15	15
Bedrooms for visiting instructors	$24.00m^2$ x 2	2
Toilets and showers	$39.00m^2$ x 4	4
Laundry rooms	$33.00m^2$ x 2	2
Storage Areas	$16.50m^2$ x 2	2
Sub-total	$1,650.00m^2$	

Service Block:

Lounges	$33.00m^2$ x 2	2
Hostel supervisor's room	$36.00m^2$	1
Corridors, stairs, etc.	$377.25m^2$	-
Sub-total	$479.25m^2$	
Total of Hostel	$2,129.25m^2$	

Dining Hall:

Dining room	$208.00m^2$	1
Kitchen	$99.00m^2$	1
Pantry	$20.00m^2$	1
Staff room	$45.00m^2$	1
Toilet	$20.00m^2$	1
Total of Dining Hall	$392.00m^2$	

Other Facilities

Guard House	$9.00m^2$	1
Machine House	$10.00m^2$	1
Total of Other Facilities	$19.00m^2$	

External Work

Covered Corridor	250m
Road within the compound	250m
Pavement	$1,670m^2$

TOTAL FACILITY PLAN AREA 5,654.125m^2

(2) Sectional Plan:

The sectional plan is closely related to the ventilation, lighting, and insulation in the various rooms. In the Admi./Training Building and the Hostel, it will be necessary to obtain proper ventilation and lighting, and we have, therefore, specified the open-sided method, which will insure that all openings are exposed to the outside.

Eaves attached to the openings are highly effective as a means of keeping out rain, adjusting illuminance, and blocking strong glare and direct sunlight on desk surfaces, and so they have been liberally used in this plan.

High ceilings have been provided, since they are commonly used as a building technique in the Project area, along with ventilating windows as a way of solving the heat problem. Ceiling height in comparable facilities is normally 2.5 - 3.5 m in ordinary small rooms and 3.5 - 6.0 m in medium-sized areas.

The ceiling heights in the Project facilities have been set as follows, based on the above survey findings:

Facility Name	Room Designation	Ceiling Height
Admi./Training	Ordinary rooms (Classrooms, offices)	3.0m
	Entrance hall	Pitched roof, cathedral ceiling
	Storage areas, toilets	2.5m
Hostel	Residential & Service Blocks	2.5m
Gymnasium	Workout area	Eave height 7.0m Cathedral ceilings Effective ceiling height set at 8.0m to allow for badminton match

Processing Building	Processing room; laboratory	3.0m
Engine Workshop	Engine training room Parts and Tool Stores	Eave height 5.0m Pitched roof, cathedral ceilings 3.0m To allow use of a ceiling crane for movement of heavy materials
Dining Hall	Dining/kitchen Staff room Pantry	3.5m 2.5m
Net Loft	Net training room; gear repair area Fishing gear store	Eave height 3.5m, Pitched roof, cathedral ceiling
Maintenance Shop	Parts maintenance room; metal workshop Parts store	Eave height 3.5m Pitched roof, cathedral ceiling

4.3.3 Building Component Plan

The conditions governing the selection of building components should include the following:

---Guarding against salt damage, owing to the seaside location.

---Climatic conditions:

...a large amount of rainfall concentrated in a short period

...high temperature and humidity

---Procuring the bulk of the components in Malaysia

1) Roofing:

Gable and hipped pitched roofs are common not only in comparable facilities but throughout the Project area. These styles are quite effective in dispersing indoor heat and coping with heavy rainfall and so

can be considered the most suitable roofing types for the natural conditions in the vicinity.

Roofing materials, regardless of roof size, are predominantly cement or rough-fired tile, followed by steel plate and cement slate. In the plan, we have specified pitched roofs as being most appropriate for the natural conditions in the area. As roofing material, we plan to use roof tile, which is most widely used in the area and is easy to maintain. In this plan, it will be necessary, with a view to heat resistance and durability, to provide ventilation in the attics as well as proper insulation.

2) Exterior Walls:

Wall materials in low-rise construction in this area are mostly rough-fired brick. This is a traditional building material in Malaysia and, along with roof tiles, is one of the most economical and most readily available materials on the market. In this plan, therefore, fair faced brick has been specified for ease of procurement and construction.

3) Exterior Openings:

Wooden doors are most commonly used in ordinary buildings and steel doors in large factories. In this plan, accordingly, we have specified wooden doors for ordinary openings in the classrooms, offices, and hostel and steels doors for the workshops, engine repair area, gymnasium, and other large facilities.

As bedroom windows, we have decided on jalousie sash, which is widely used in the area. These windows will be of aluminum construction to prevent salt damage.

The main points considered in window design were: (1) allowing deep eave spaces to block direct sunlight; and (2) preventing rain from blowing in from the outside by paying careful attention to water return. In this plan, the appropriate size of the eaves was determined on the basis of sun elevation.

4) Flooring:

The standard flooring for bedrooms and work rooms will have a concrete base with a mortar finish. However, in the key portions of the facilities, as in the entrance hall area in the Admi./Training Building, the Directors' offices, instructor's rooms, classrooms and conference room, we have chosen to specify a terrazzo finish, which is commonly used in the area and is both durable and easy to maintain.

In the dining room, kitchen, processing room, and toilets, we plan to use a porcelain tile finish for sanitary reasons.

5) Interior Finish:

As interior finishes, we plan to use the following materials, as appropriate. In the case of the ceilings, we will also use insulating material.

Ceilings:	stripped wood, acoustical board, veneers, waterproof boards with a paint finish
Walls:	Mortar base with a paint finish, cloth finish, veneer panel finish

4.3.4 The Structural Plan:

(1) Structural Method:

Based on the intended usage and scale of the facilities, the possible structural methods would be construction of wood, brick, concrete, and steel frame. In Malaysia, posts and beams are most commonly of concrete construction, walls of brick, and roofs of wooden truss construction. In the existing facilities as well, these methods have been used, though steel frame trusses are used for the roofs, which require large spans. This is because the composition of larger spaces is easier to achieve than with other methods, while it is also easier to secure quality and precision in the building materials, thereby shortening the construction period.

The main structural form in the Project facilities will be reinforced concrete, employing a rigid structure. The roofs will, in principle, use the wooden truss method in deference to local construction customs and span intervals. However, in the gymnasium, dining hall,and other facilities with wide span intervals, we have specified steel frame construction.

(2) Foundation Structure:

The soil formation in the Project area is composed of surface sand, sand, marine clay, and weathered rock. Based on the findings from soil surveys, which included boring surveys, fill layers are composed of excellent quality sand material, and so we may anticipate a foundation composition with a long-term load bearing strength of 8 tons.

Since the Project facilities are of relatively light, low-rise (2-story) construction, we have concluded that the soil layer in the area is quite satisfactory as a bearing foundation.

Based on the above considerations, direct support, independent footings has been selected as the basic structural method for the Project facilities.

(3) Structural Materials:

The main structural materials will be as follows:

a) Concrete:

Ordinary concrete-- design strength Fc = 210 kg/cm^2
Plain concrete-- design strength Fc = 180 kg/cm^2

b) Steel bar:
Ordinary bar-- yield point: 2,500 kg/cm^2
Deformed bar-- yield point: 4,100 kg/cm^2

4.3.5 Facility Plan:

(1) Electrical Facilities:

Power supply to the Project facilities will be branched from the transformer station belonging to the Fishery Enforcement Office on the north side of the site, brought into the main receiving terminal at the project facility, and redistributed to branch terminals in the various facilities. The intake trunk line will, in principle, be buried, with PVC conduit pipes to be used for distribution within each structure.

In planning the electrical system, we have specified simple yet effective facilities, avoiding complex equipment that would be hard to handle and would require sophisticated maintenance. From a maintenance standpoint, materials and products have been chosen, wherever possible, that conform to local specifications and can be readily procured in Malaysia.

The electrical facilities have been classified into 2 systems: a wall outlet system for lighting and a power system. The maximum power loads have been estimated as follows:

Lighting & socket load	54.0 kva
Air conditioning & ventilating load	95.0
Other loads	55.0
Total	204.0 kva

1) Lighting Sockets:

The most commonly used lighting systems in the area are fluorescent and incandescent. For ease of maintenance, locally produced products will, in principle, be used in the Project. The luminosity of the Project rooms has been set as follows, in accordance with local conditions.

Main rooms (offices, classrooms, conference rooms)	300 lux.
Processing room, engine workshop, maintenance shop	150 lux.
Gymnasium	100 lux.

Hostel	150 lux.
Dining room / kitchen	200 lux.
Corridors and storage areas	100 lux.
Toilets and laundry rooms	100 lux.
On the grounds	10 lux.

The socket system will be composed of two types: ordinary sockets for the classrooms and offices and specialized sockets for equipment and tools installed in the engine workshop, maintenance shop, and other areas. Load voltages will be 240v, 50 Hz for ordinary sockets, while the specialized sockets will be divided between single-phase 240v, 50 Hz and 3-phase 415 v, 50 Hz, depending on the type of equipment involved.

2) Power Facilities:

Power will be supplied to machine tools (refrigerator and processing equipment in the Processing Building and the compressors and welding units in the engine training room) and to such equipment as the lifting pump for the overhead water tank, fire extinguishers, and air conditioning equipment. The load voltage will be 415 v, 50 Hz.

3) Lightning Rods:

Lightning rods will be installed on the Admi./Training Building, Hostel, and Gymnasium.

4) Telephone, Intercom, and Public-address Facilities:

Telephone lines will be brought into the offices, hostel supervisor's quarters, and the kitchen in the Dining Hall. The installation of telephones and switchboards are to be the responsibility of the Malaysian side.

Intercom facilities will be provided for internal communications between the offices, training areas in the various facilities, the hostel supervisor's quarters, and the kitchen in the Dining Hall. Public-address equipment will be installed between the Admi./Training Building and the main training buildings.

5) Fire-fighting Equipment:

In accordance with local regulations, the Admi./Training Building, Hostel, and Gymnasium will be equipped with emergency lights, emergency exit signs, and manually operated fire alarms as well as other fire-fighting equipment.

6) Emergency Generating Equipment:

Generating equipment will be provided as a standby power source for the lifting pump, refrigerator in the Processing Building, laboratory and navigation room in which precision equipment will be stored, kitchen in the Dining Hall, crane, emergency lighting, fire extinguishers, emergency exit lights, inductive lighting, and the manually operated fire alarms and related fire-fighting equipment.The generator specifications will be as follows:

Engine: Diesel

Voltage: 3-phase, 4 lines, 415 v/ 240 v, 50 Hz

Generating capacity:

50 kva

Fig. 4.11 shows the power system for the facilities.

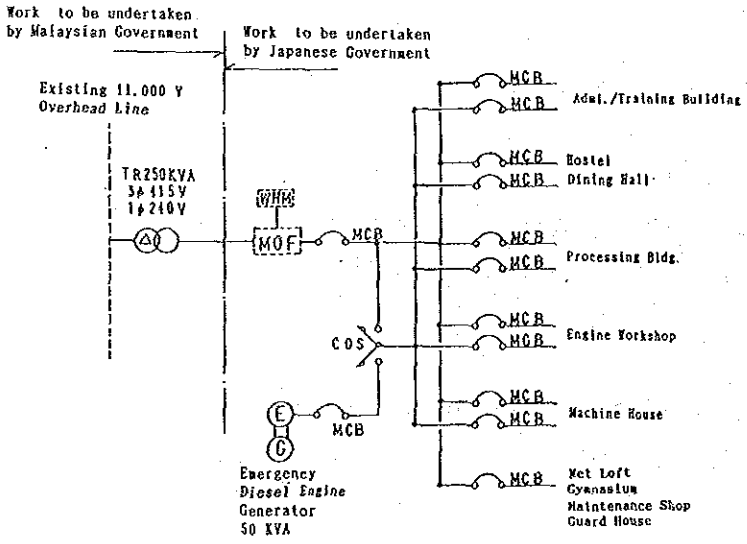


Fig. 4.11 Power System

(2) Water Supply, Sewerage, and Sanitation Equipment:

1) Water Supply:

Water will be provided to the Project site via branching and underground cisterns from the municipal water pipes installed along the access road. The method of water supply will be a pressure-type system, bringing water to the required facilities after being raised from the underground cisterns to the overhead tank. Daily supply may be estimated as follows:

Admi./Training Building	$19.0m^3$
Hostel	$27.5m^3$
Dining Hall	$6.5m^3$
Other	$4.0m^3$
Total	$57.0m^3$

2) Sewer Facilities:

The ordinary method of sewage treatment in the area is to discharge only rainwater directly, with all other sewage and wastewater treated in septic tanks and then discharged into a drainage channel. Waste water from the Engine Workshop and the Processing Bldg. will be treated to filter oil, sludge and residue and then discharged.

3) Fire-fighting Facilities:

Pursuant to local fire laws and regulations, the Admi./Training Building, Hostel, and Gymnasium will be equipped with fire hydrants and hose reels, with a special tank to be provided for the hose reel facilities.

4) Gas Facilities:

Separate LPG cylinders will be installed in the Admi./Training Building, Hostel, Dining Hall, and Processing Building, with gas to be delivered to the rooms as required.

(3) Air Conditioning and Ventilating Equipment:

1) Air Conditioning:

From the standpoint of maintenance and operating costs, room air conditioners will be used. They will be installed in the following rooms:

offices in the Admi./Training Building; in the navigation training room, where precision instruments will be provided; and the laboratory in the Processing Building, for the analytical equipment.

2) Ventilating Equipment:

Ceiling fans will be installed in the classrooms in the Admi./Training Building, special classrooms, the dining room in the Dining Hall, and the Hostel lounges. Exhaust fans will be provided in the toilets and processing room.

4.4 Fishery Training Vessel

This purse-seine type vessel is mainly intended for training on navigation and fishing operations for trainees in the Deep-Sea Fishery Course, Navigation Course, and Fishing Gear Technology Course. The particulars of the vessel will have to be decided on the basis of the conclusions discussed in Section 3.3.4.2 regarding the principal capacity, size, arrangement, and machinery. In addition, the following points should be considered in the basic design.

(1) Among the training subjects taught with this vessel, training of deck hands for offshore fishing vessels will have prime importance. Hence, the size of fishing net and gear can be sacrificed to a certain degree to maximize the efficiency of the onboard training.
(2) Sufficient space should be secured on the upper deck to facilitate easy casting and hauling of purse-seine nets while the hull design shall provide high stability under any work conditions.
(3) The net area should allow easy inspection and handling of nets at the time of hauling.

(4) In the vessel design, variations of trim at the time of departure and return and during operation should be fully considered.

4.4.1 Principal Particulars:

Rules and Regulations:	All Japanese Maritime Regulations to be applied for this type of ship
Vessel Class:	NK, NS* (Fisheries Training), MNS*
Hull Material:	Steel

Principal Dimensions: (approximate)

Length, overall	28.0m
Length, p.p.	24.0m
Breadth, mld.	7.2m
Depth, mld.	3.15m
Draft, full loaded	2.65m

Gross tonnage (international)

165 tons

Service speed 10.0 knots

Capacities: (approximate)

Fish hold	$20m^3$
Fuel tank	$25m^3$
Freshwater tank	$8m^3$
B.W.T. (F.P.T)	$3m^3$
(Aft B.W.T)	$8m^3$

Complement: 21

Captain	1
Mate	1
Quartermaster	1
Crew	2
Chief engineer	1
Engineer	1
Oiler	1
Cooks	2
Trainer	1
Trainees (minimum)	10
Total	21

Main Engine:

Maximum Continuous Output

720ps x 1 unit

4.4.2 Design Conditions

	Sea Water Temp.	Ambient Temp.	Atmospheric Temp.	Atmospheric Pressure
Propelling Machinery	34°C	45°C		760mmHg
Auxiliary Machinery	34°C	45°C		760mmHg
Electric Plant	34°C	45°C	35°C	
Air Conditioning Plant	34°C		35°C	

Other details on machinery, engine, and electric equipment are shown in Appendix V-6.

4.5 Training Equipment

The detailed list is attached as Appendix V-5. The major pieces of equipment are outlined below.

(1) *Equipment for navigation and radio training:*

Radar with image playback device	2 units
Scanning sonar	1 unit
SSB radiotelephone 150w	1 unit

(2) Equipment for engine training:

30ps diesel engine for assembly and dismantling	5 units
Diesel engine for operation training	250ps, 100ps, 30ps each 1

(3) Equipment for fishing gear training

Sample of netting and net materials	1 lot
Mini power block	1 unit

Mini winch	1 unit

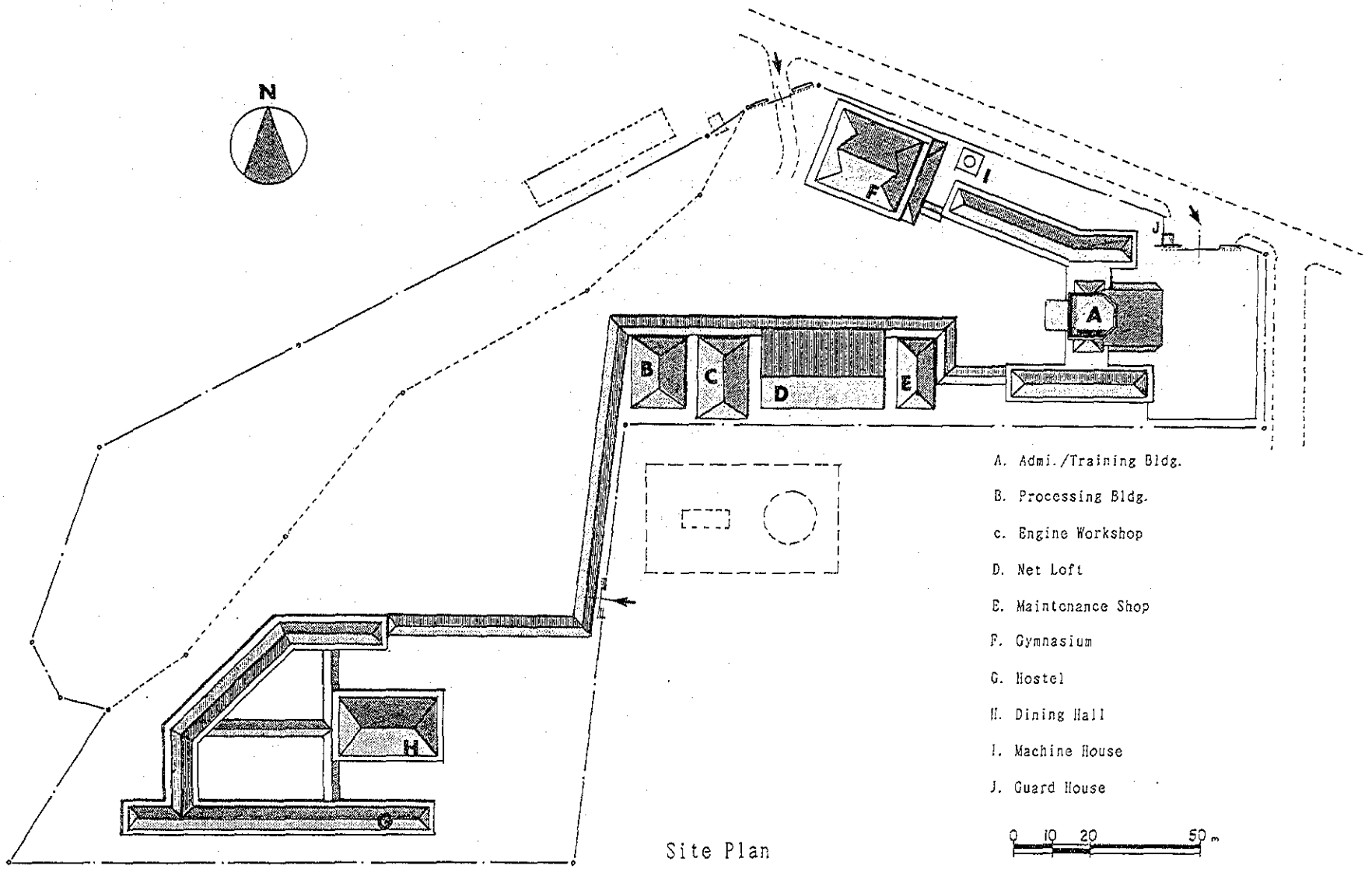
(4) Equipment for processing training

Surimi equipment	1 set
Canning equipment	1 set
Hygienic sensing equipment	1 lot

(5) Other equipment

Video equipment for producing teaching materials	1 set
Printing equipment	1 set
Vehicle	3 units

4.6 Basic Design Plan



A. Admi./Training Bldg.

B. Processing Bldg.

c. Engine Workshop

D. Net Loft

E. Maintenance Shop

F. Gymnasium

G. Hostel

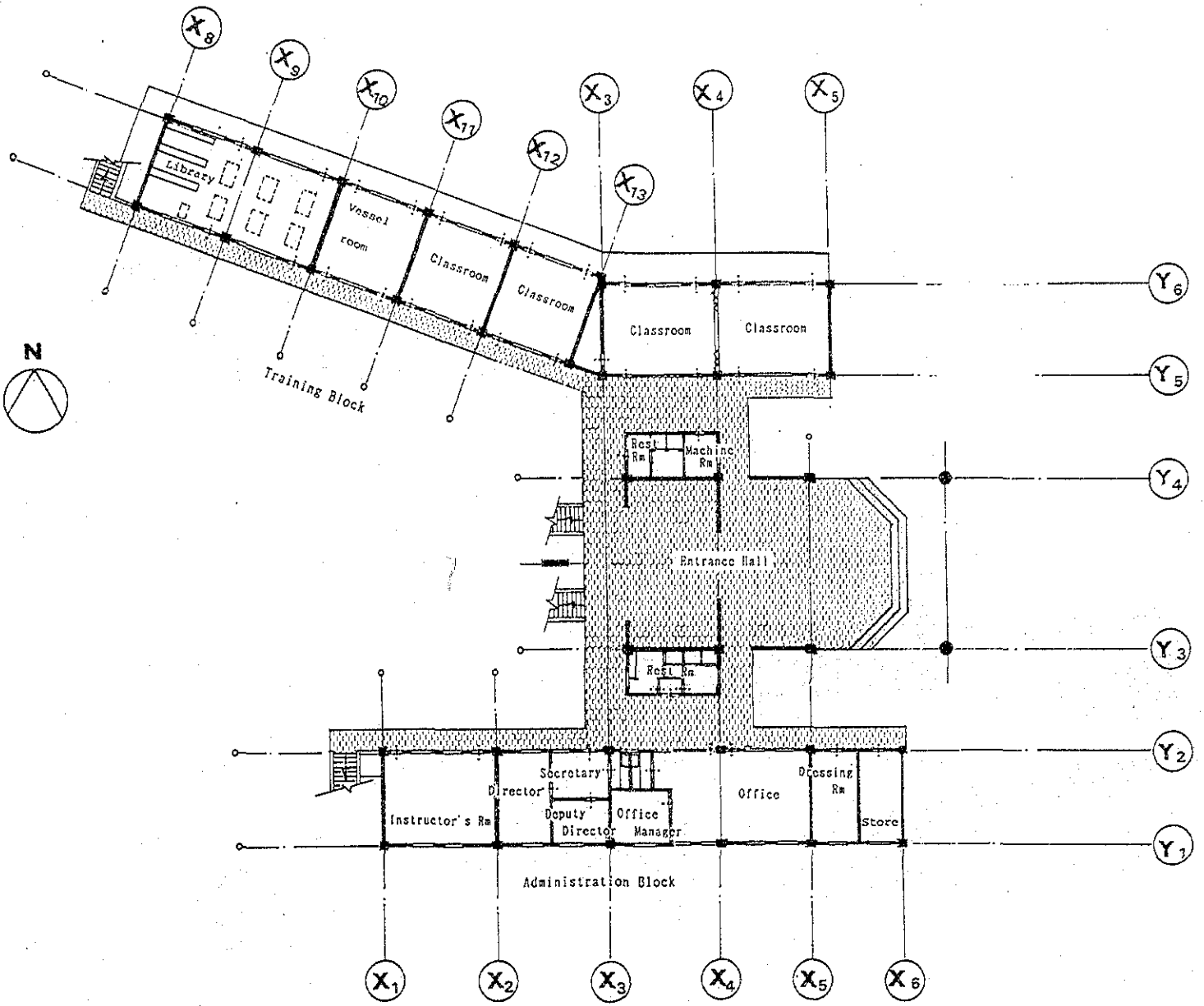
H. Dining Hall

I. Machine House

J. Guard House

0 10 20 50 m

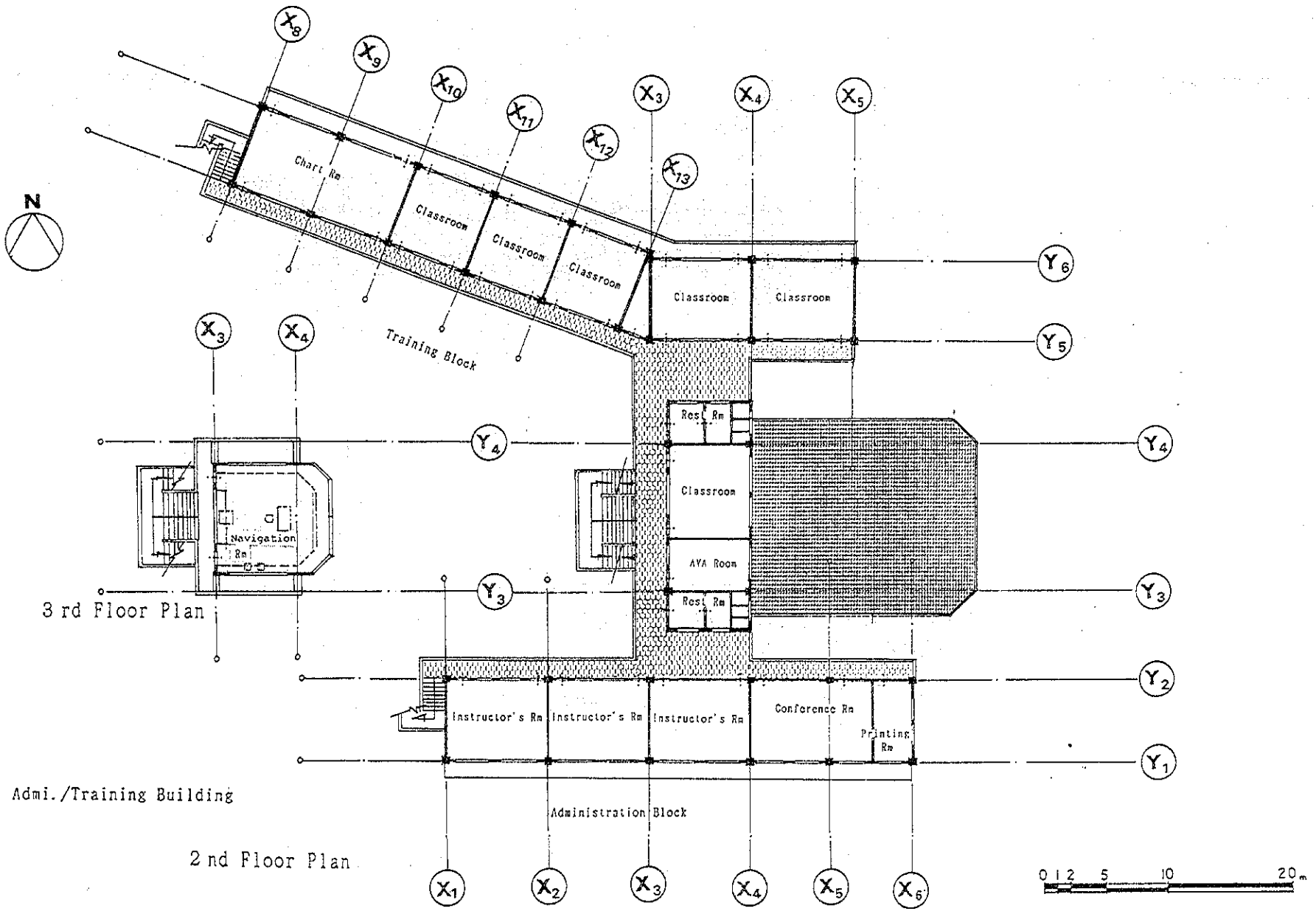
Site Plan



Admi./Training Building

1 st Floor Plan

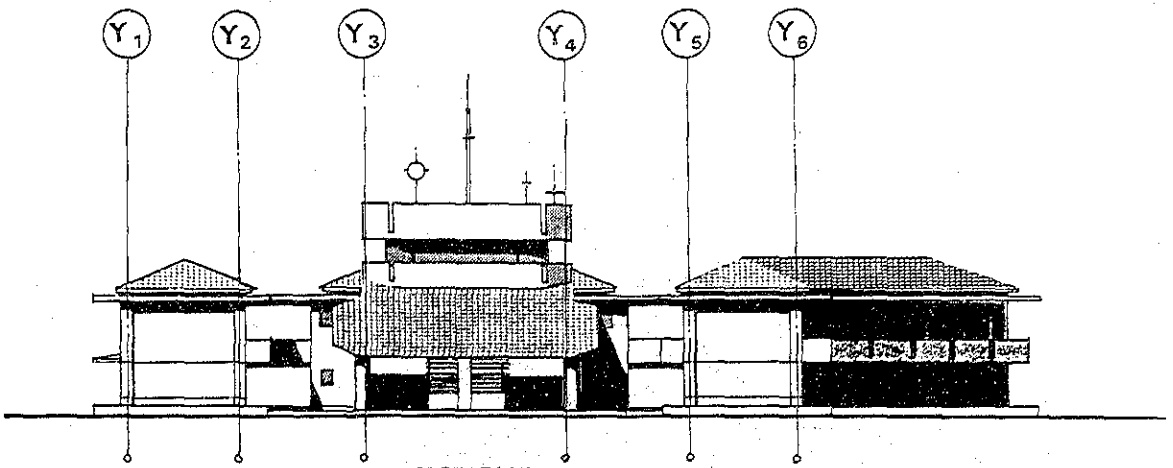
0 1 2 5 10 20m



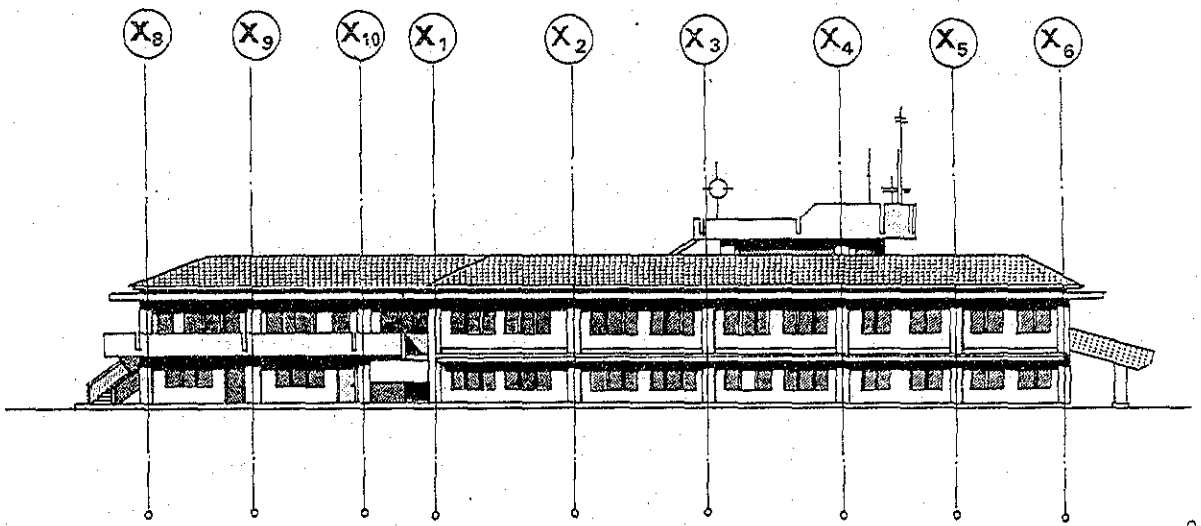
3 rd Floor Plan

Admi./Training Building

2 nd Floor Plan



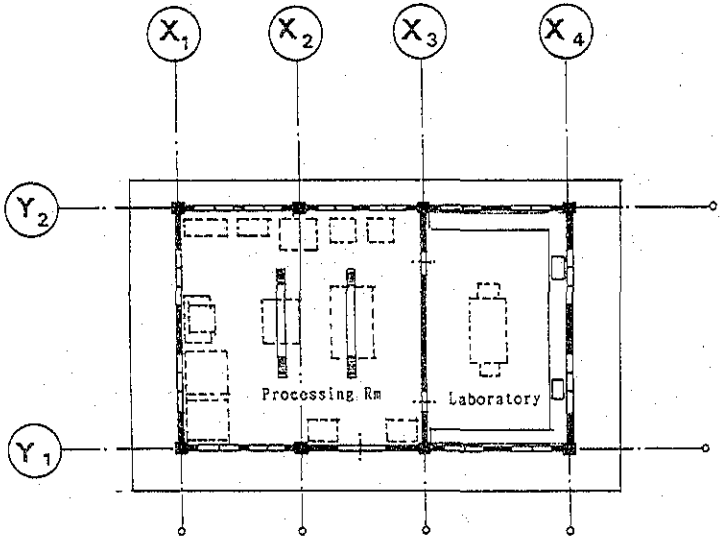
ELEVATION



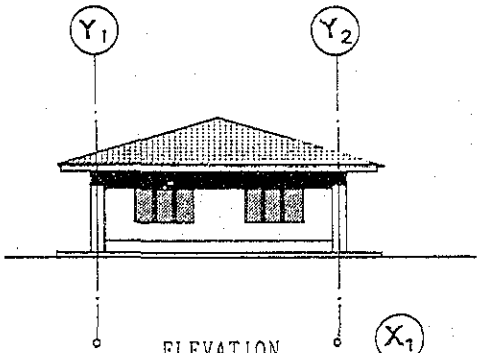
Admi./Training Building

0 2 5 10 20 m

ELEVATION



Processing Bldg. Floor Plan



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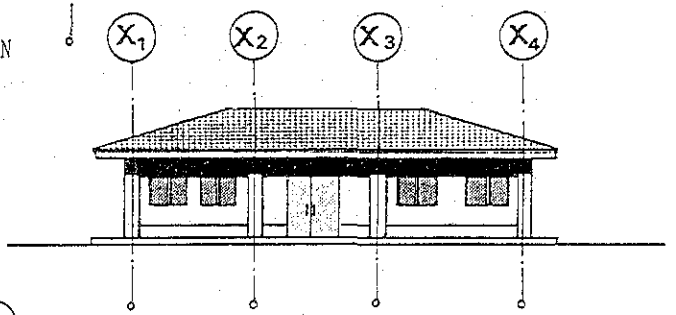

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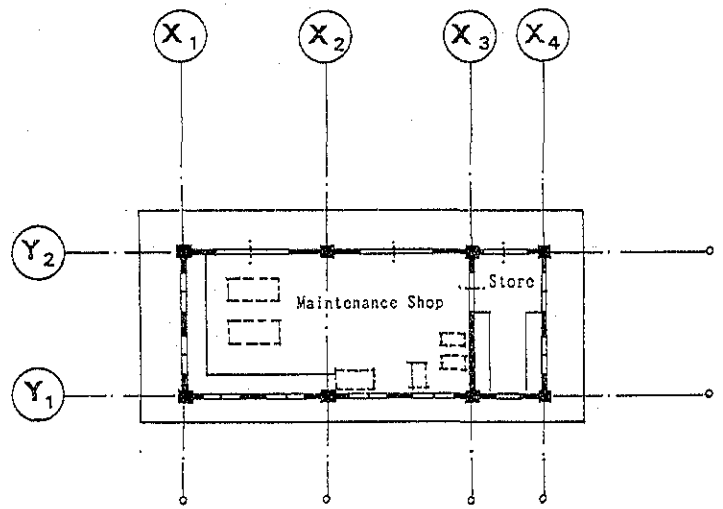
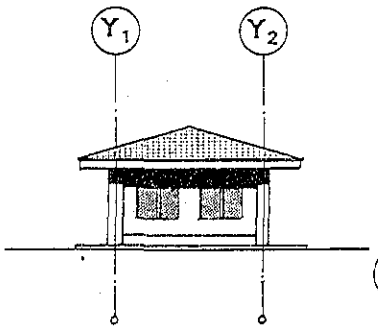


Maintenance Shop Floor Plan



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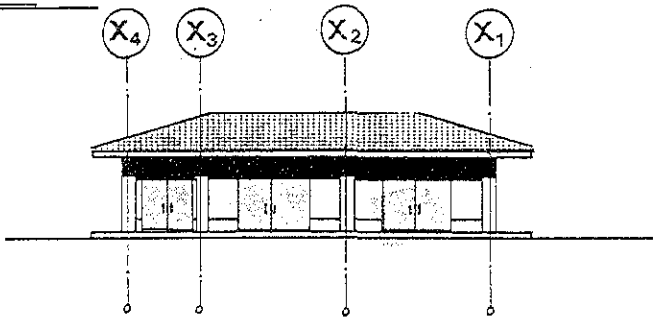

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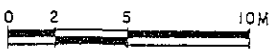
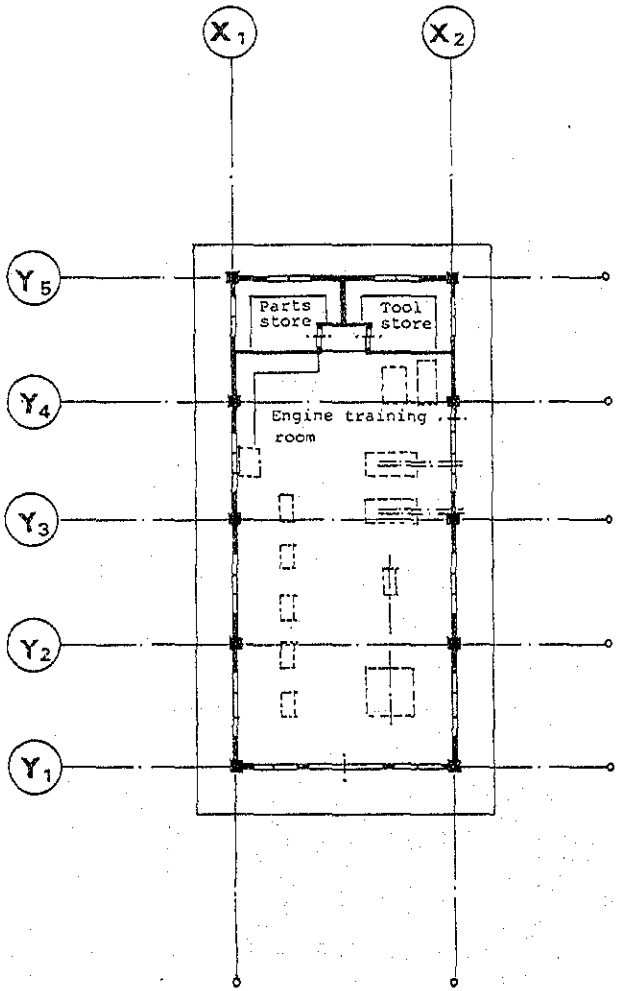
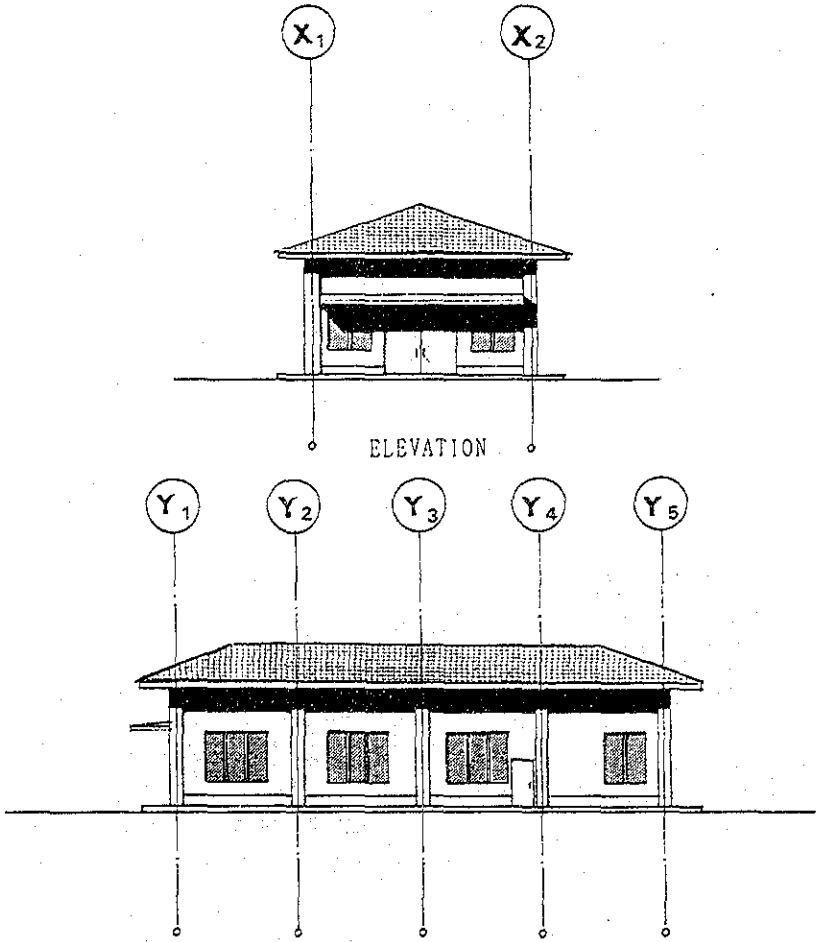
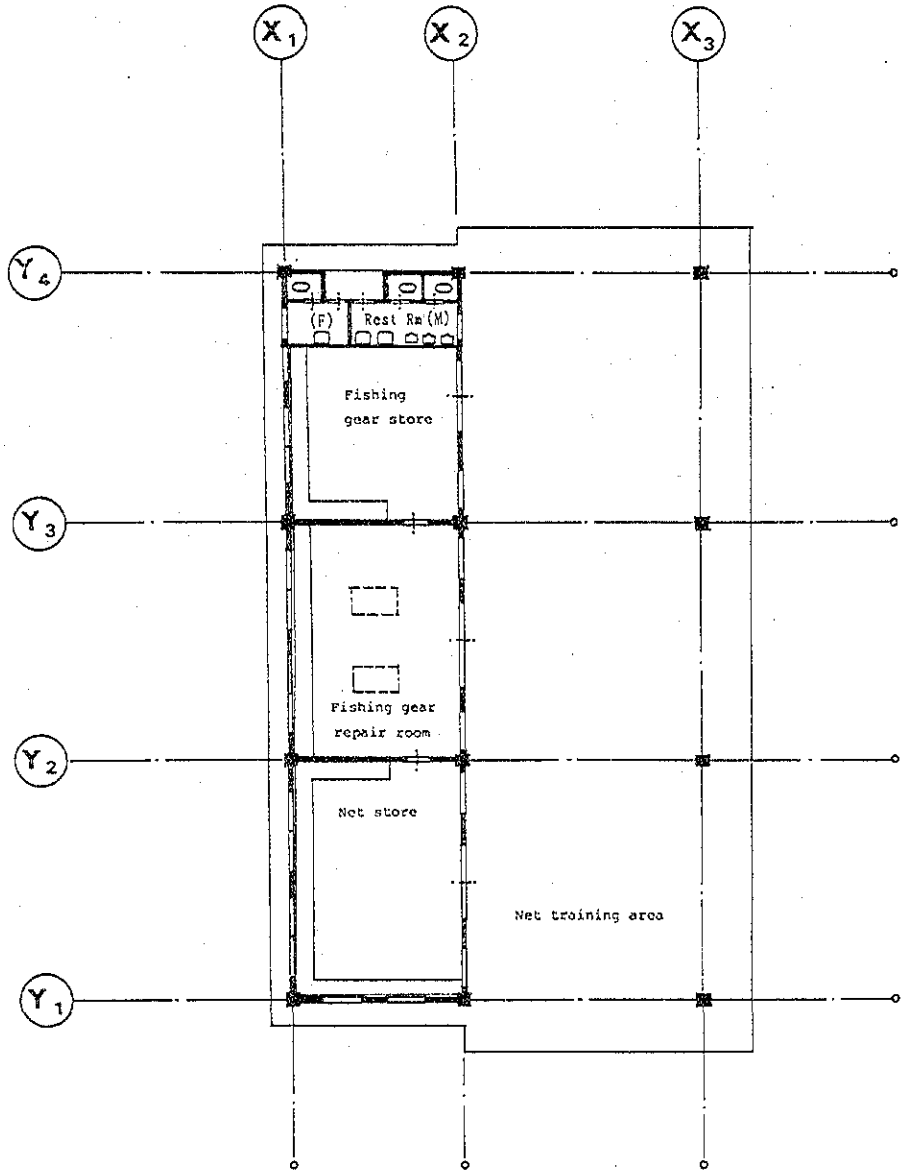




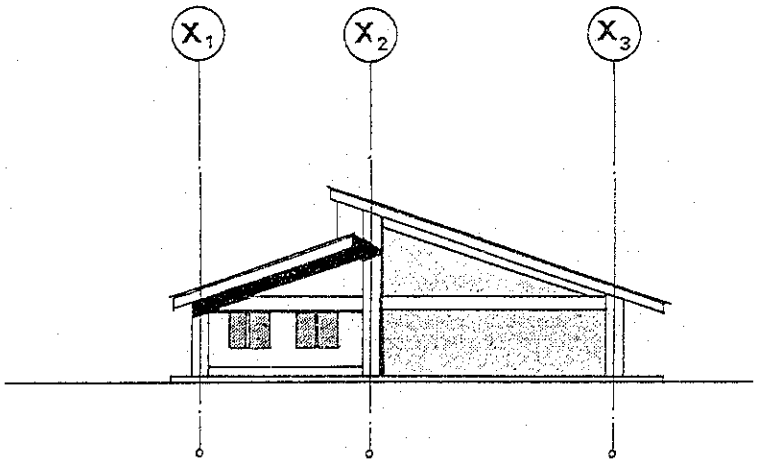
Floor Plan



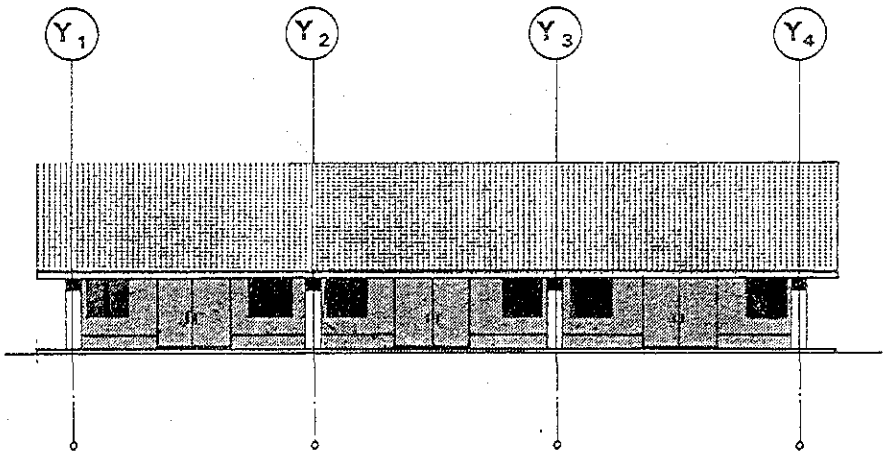
Engine Workshop



Floor Plan



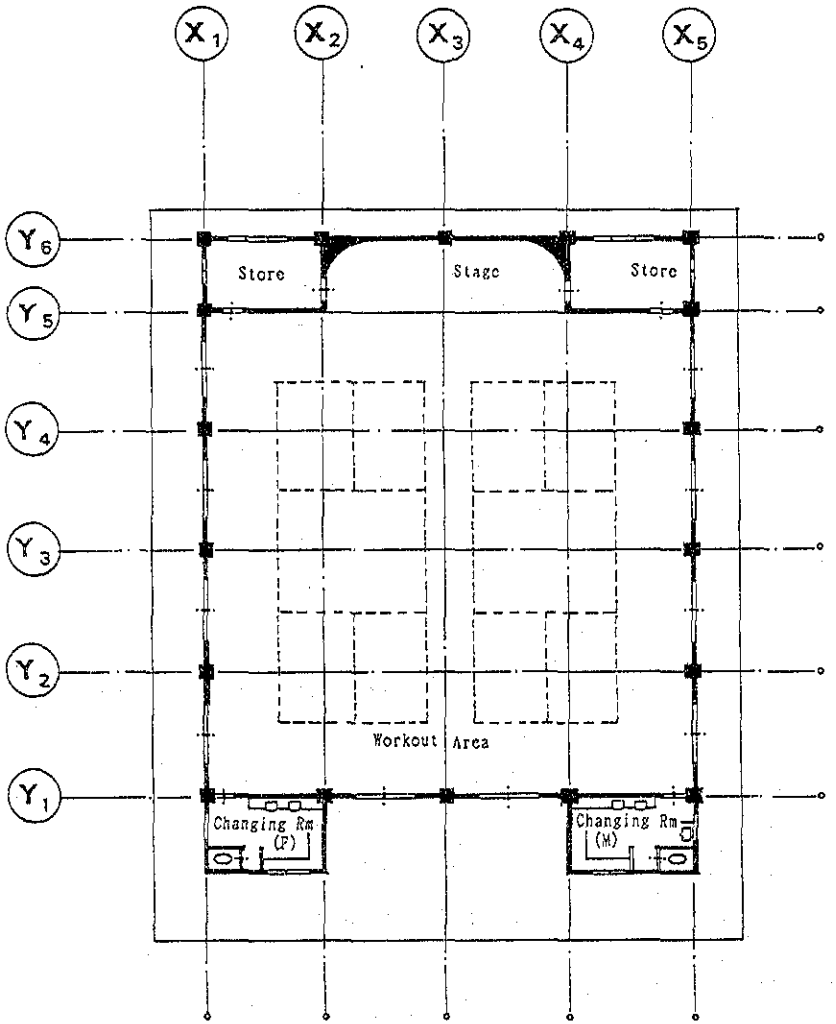
ELEVATION



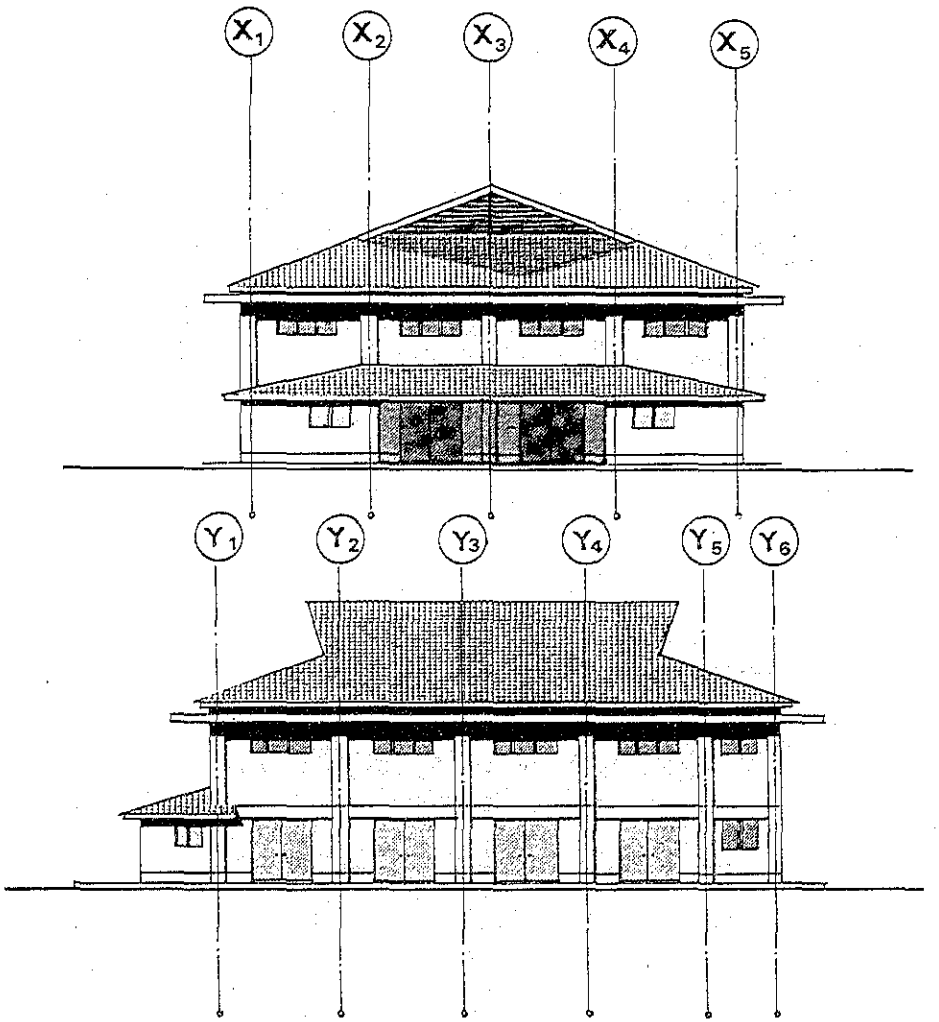
ELEVATION

0 2 5 10 m

Net Loft



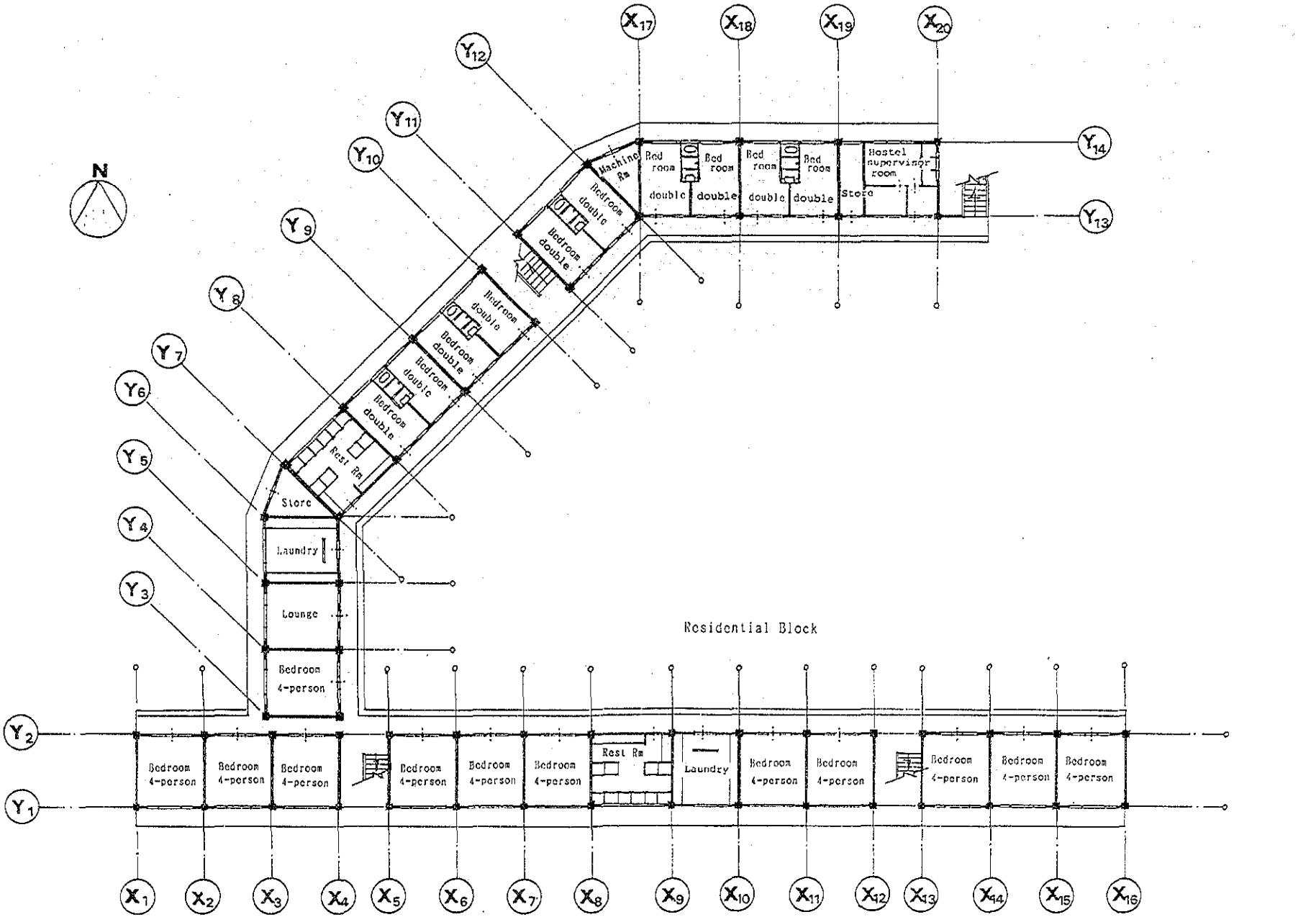
Floor Plan

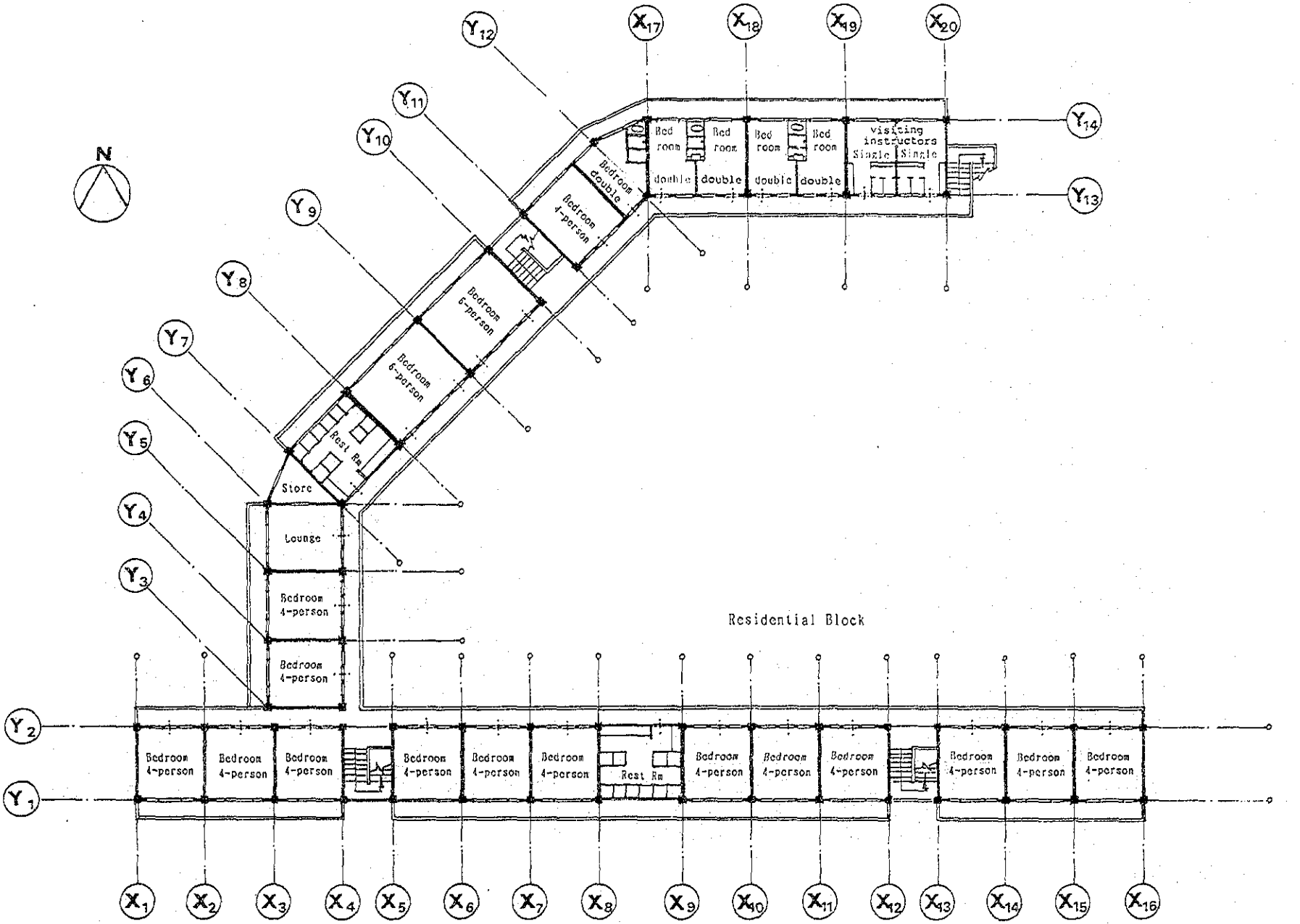


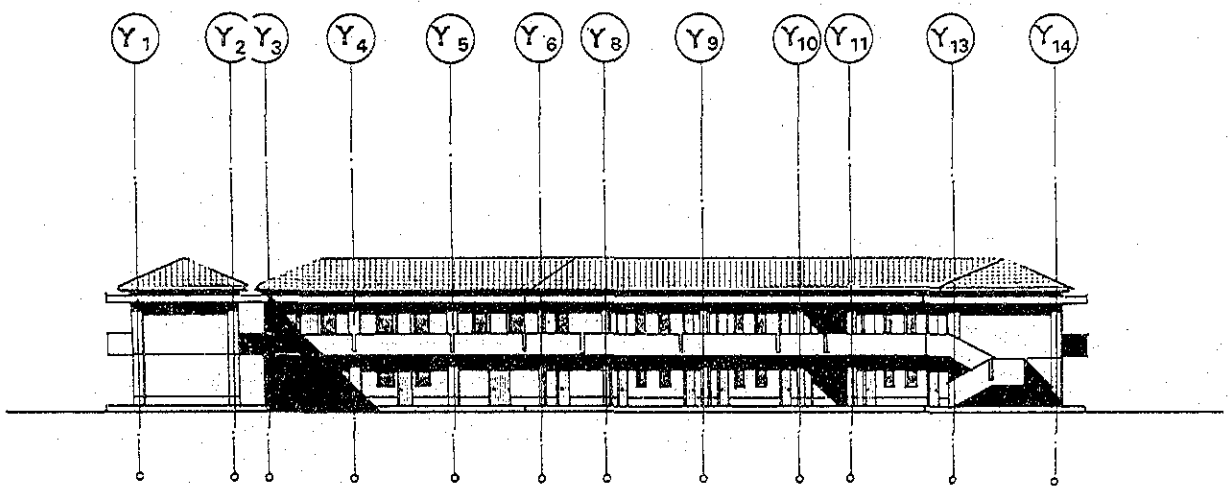
ELEVATION

0 2 5 10M

Gymnasium


N
Residential Block
Machine Rm
Bed room
double
Hostel supervisor room
Store
Bedroom double
Rest Rm
Laundry
Lounge
Bedroom 4-person
Hostel
1st Floor Plan
0 1 2 5 10 20 m


N
Bed room
double
visiting instructors
Single
Bedroom 4-person
Bedroom 6-person
Rest Rm
Store
Lounge
Residential Block
Hostel
2 nd Floor Plan
0 1 2 5 10 20 m



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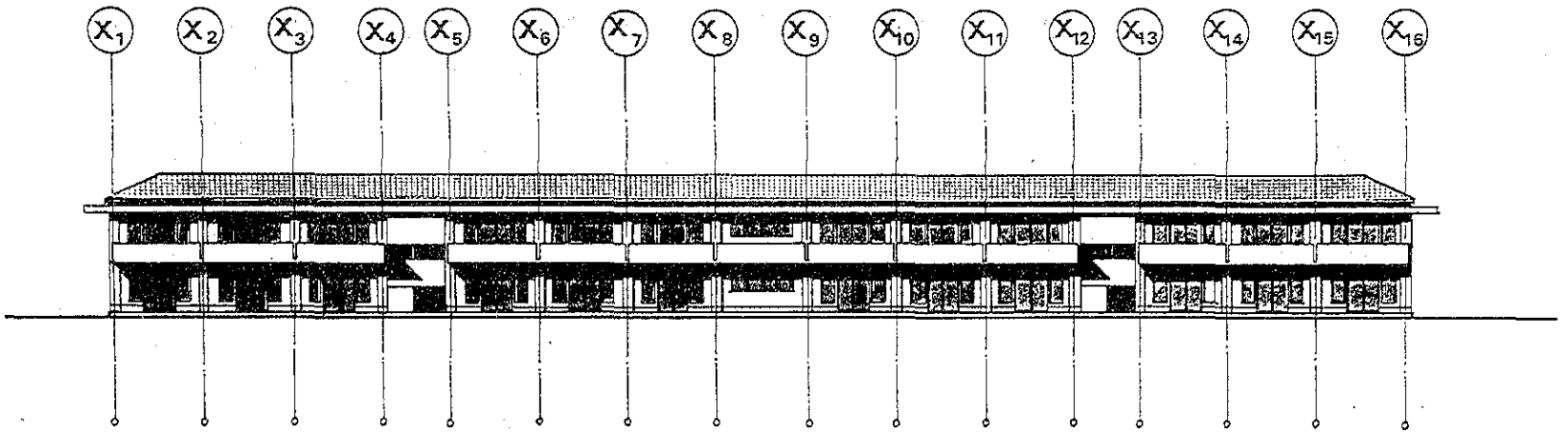
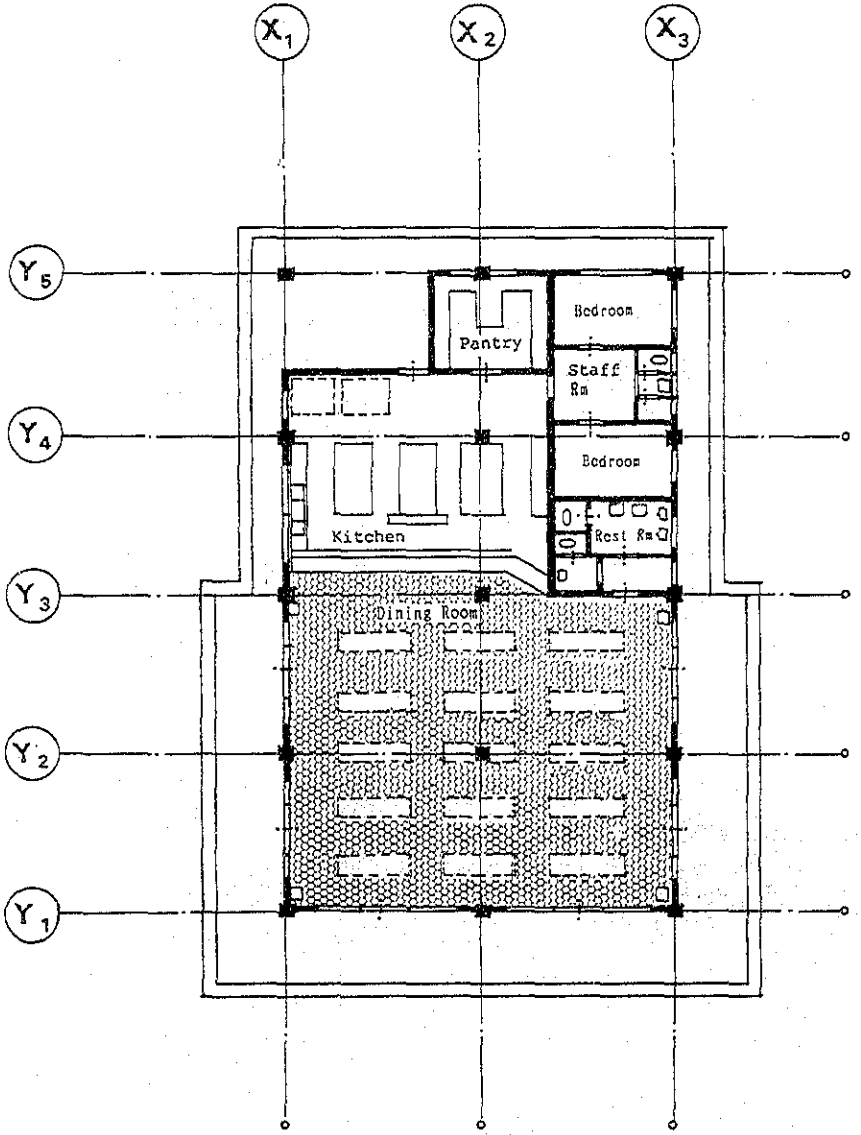


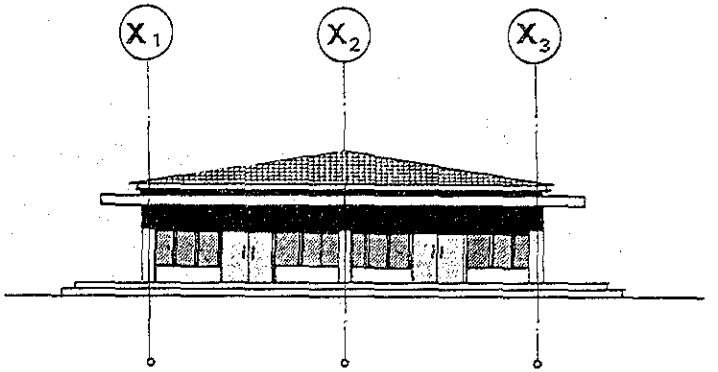
ELEVATION

Hostel

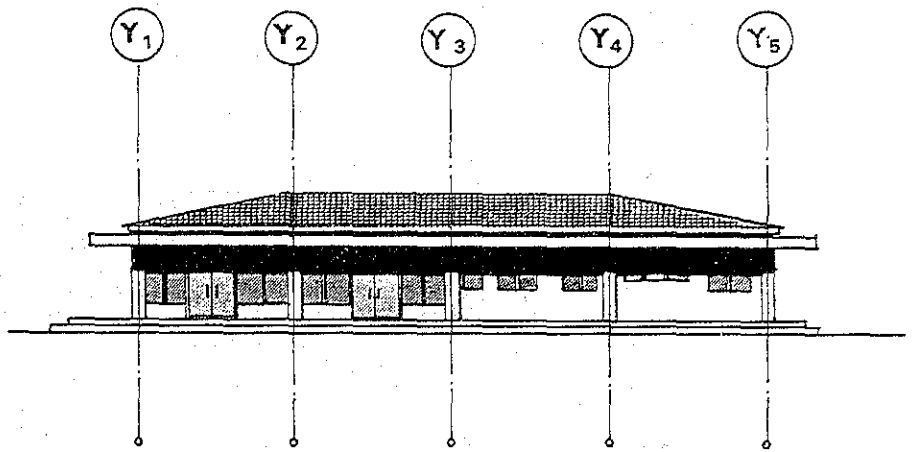
0 2 5 10 20m



Floor Plan



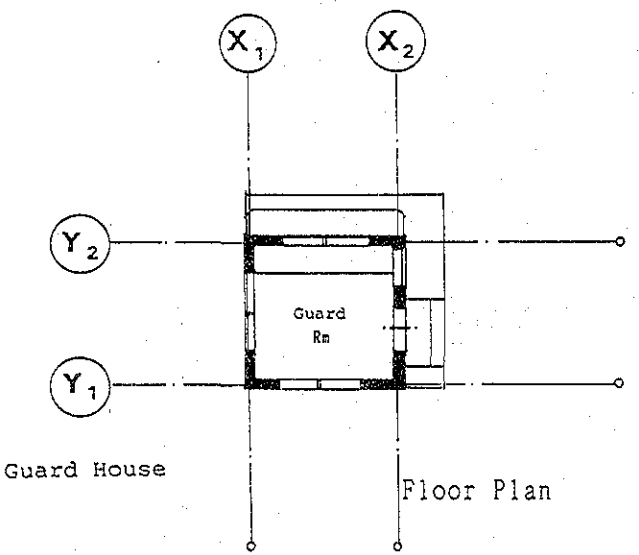
ELEVATION



ELEVATION

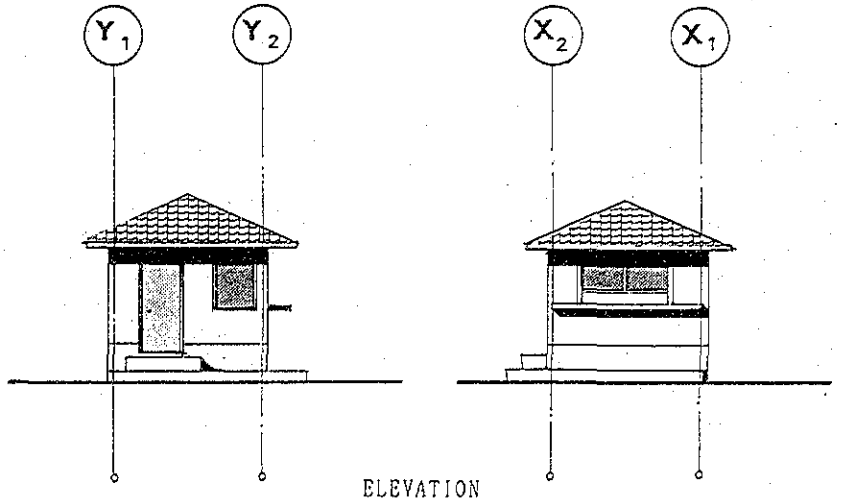
0 2 5 10 m

Dining Hall

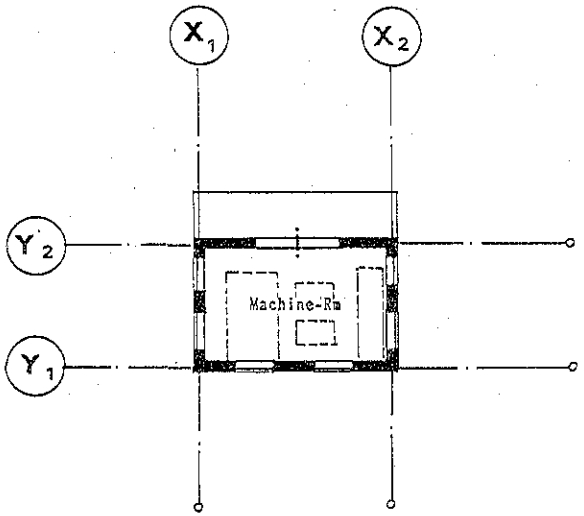


Guard House

Floor Plan

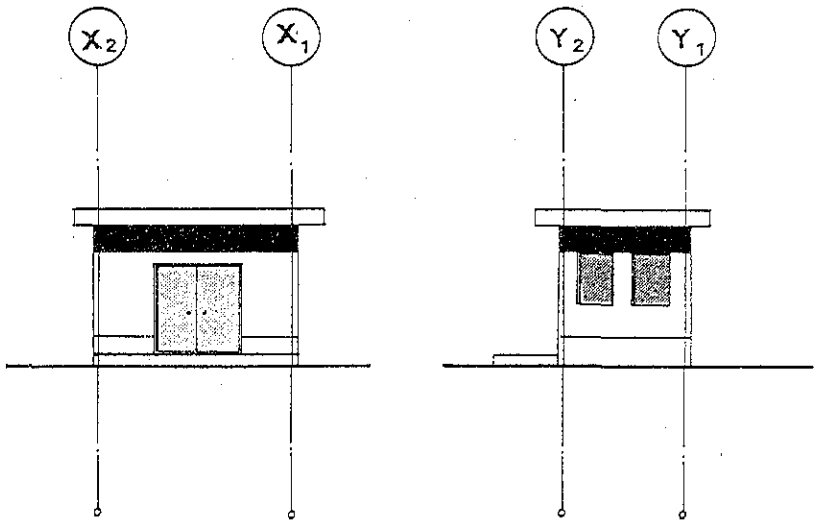


ELEVATION



Floor Plan

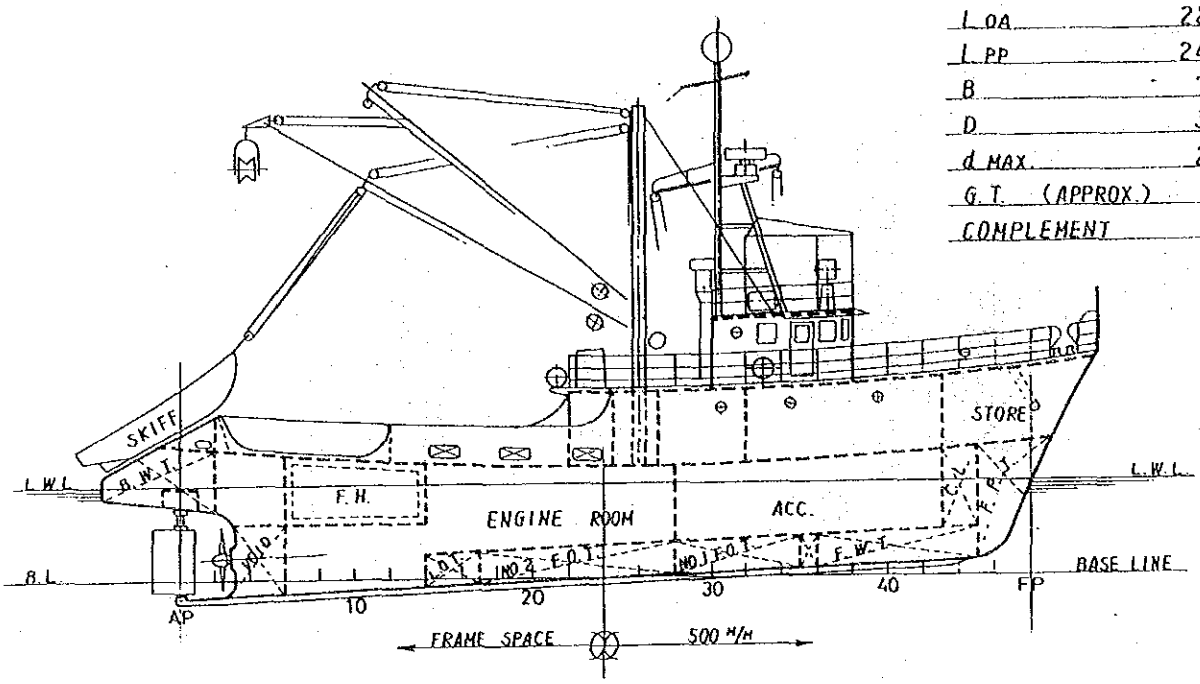
Machine House

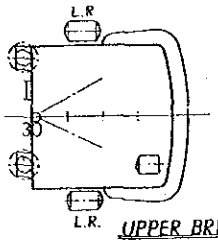


ELEVATION

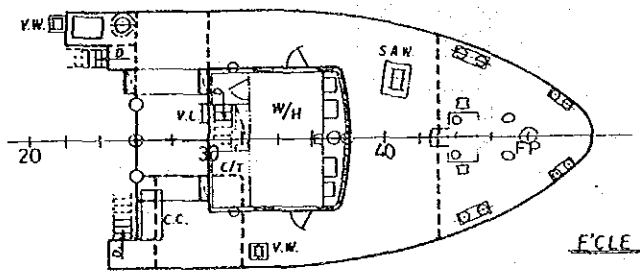
FISHERIES TRAINING VESSEL GENERAL ARRANGEMENT

PRINCIPAL DIMENSIONS	
L OA	28.00 M
L PP	24.00 M
B	7.20 M
D	3.15 M
d MAX.	2.65 M
G.T. (APPROX.)	165 T
COMPLEMENT	21 P

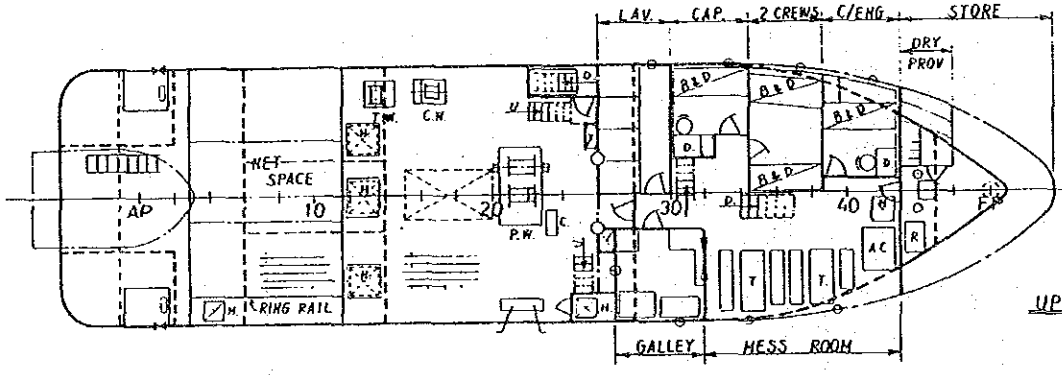




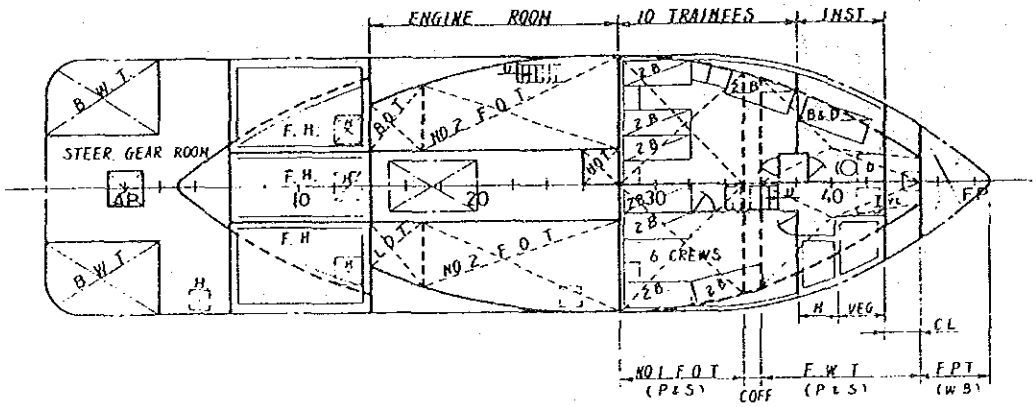
UPPER BRI. DECK



F'CLE DECK



UPPER DECK



HOLD

SCALE : 1/200

4.7 Construction Plan:

4.7.1 Construction Policies:

The Project site has already been improved into level condition. An access road has been provided on the north side, with power and water lines laid along this road. The construction of the Project facilities can certainly be accommodated through local construction methods, and the construction schedule can proceed from the foundation work, structural work, finishing work and to the supply of equipment and materials.

The following considerations should be borne in mind in connection with the construction plan:

(1) While unskilled labor is readily available, in the case of specialized construction requiring specialized skills, such as electrical and plumbing work and steel frame work, not only are labor resources tight but, since the Project area is quite remote from the capital, Kuala Lumpur, special consideration will have to be given, in the case of a relatively large-scale project like this, to the requirement for a large number of skilled workers over a short period of time.

(2) The majority of the materials are to be sourced locally, mainly concrete, bricks, roofing tile, and equipment. All of these items are produced in Malaysia, and so we anticipate no particular procurement difficulties. However, in order to avoid a shortage of materials during periods of concentrated orders, the procurement program must be carefully planned.

(3) Rainfall in the Project area is heavy, exceeding 3000 mm per year, of which 40% falls during the months of October and November, with more than 25 days of rain in each of these months. This situation should be taken into account in developing the construction plan, particularly in connection with the initial foundation work phase and the finishing work at the end of the Project, which are most affected by weather conditions.

(4) Considering the scope of the Project and the overall construction period, it has been deemed appropriate to carry out the Project in two

stages. The first phase will comprise the construction of facilities and supply of equipment, with the second phase to include the fishery training vessel.

4.7.2 Construction Plan:

The construction plan will utilize local construction methods in all its phases, with the bulk of the materials and labor to be locally procured.

Since this Project is to be carried out under cooperative grant-aid from Japan, the understanding and support of local contractors will be vital in terms of observing and obtaining proper quality levels as well as in construction precision and adherence to time schedules. Detailed liaison and coordination will be required to this end.

The organizational structure for local supervision will require, in addition to the persons in charge of the construction program, the installation of a resident supervisory system and the dispatch of technicians for short periods in connection with the installation of training equipment and pilot operation of the training vessel.

4.7.3 Supervision Plan:

In connection with Project implementation both for the phase one and two, following the Exchange of Notes between the Government of Japan and the Malaysian Government, a Consultant Contract is to be signed between a Japanese consultant and the Malaysian Government. The Consultant will prepare detailed design plans, specifications, project budgets, tenders, and contracts as necessary for the Project and will select contractors, with the approval of the Malaysian Government, through tender qualification, tenders, and the evaluation of tender documents.

Since this Project involves not only building facilities but also a training vessel and a substantial volume of training equipment and materials, orders will be placed independently for each field.

Following the signing of construction contracts, supervisors will be dispatched to Malaysia to conduct local checks of the construction plan, inspect machinery in production, and supervise work on the fishery training vessel as well as the manufacturing of equipment to ensure that the Project moves ahead on schedule and is carried out precisely according to plan.

4.7.4 Material Procurement Plan:

1) Building Materials:

Local sourcing will be the rule for all building materials found in Malaysia. The bulk of the required materials, such as cement, R-bars, bricks, wood, roofing tiles, and other products for the various facilities, are available locally. The items that will have to be imported from Japan are those which are not produced in Malaysia, and a part of the machinery selected on the basis of cost, quality and delivery time considerations.

The procurement plan for the main items of construction materials are as follows.

Main construction materials	Area of Procurement
Sand	Malaysia
Gravel	Malaysia
Cement	Malaysia
Reinforcing bar	Malaysia
Steel frame	Malaysia
Bricks	Malaysia
Timber, plywood	Malaysia
Doors & windows	Malaysia
Paint	Malaysia
Roof tiles	Malaysia
Tiles	Malaysia
Materials for electric and plumbing work	
Cable	Malaysia/Japan
Lighting equipment	Japan

Switches, outlets	Malaysia
Distribution boards	Japan
Refrigerator	Japan
Air conditioners	Japan
Emergency generator	Japan
Pipes	Japan
Sanitary fixtures	Malaysia
Pumps	Japan
Elevated tank	Japan
Valves	Malaysia

2) Construction machinery

Many contractors in Malaysia own and lease construction machinery used for ordinary construction work. This construction equipment is in general in good working condition and various types of equipment with different capacities are available. The majority of the equipment required for the Project facility construction can be supplied in Terengganu. The expected equipment and its source area are indicated below.

Tower crane	Malaysia
Truck crane	Malaysia
Dump truck	Malaysia
Bulldozer	Malaysia
Excavator	Malaysia
Generator	Malaysia

(2) Fishery Training Vessel:

Steel vessels of 30m l.o.a. are commonly built in Malaysia. However the majority of the equipment to be fitted on the training vessel must be imported and there are few shipyards which have built purse-seiners. Thus, is has been concluded that the training vessel should be constructed in Japan.

(3) Training Equipment

Netting and other fishing gear being produced in Malaysia and some equipment which will be advantageous from the view point of maintenance will be purchased in Malaysia. Other equipment will be brought from Japan.

4.7.5 Allocation of Construction Responsibilities:

(1) Area of Responsibility of the Government of Japan:

In the event that this Project is implemented with grant-aid from Japan, the Government of Japan will be responsible for the following phases:

1. Construction of the following facilities, as required for the implementation of training programs:

   Admi./Training Building, Engine Workshop, Processing Building, Net Loft, Gymnasium, Maintenance Shop, Guard House, Machine House, and exterior construction.
2. Construction of incidental facilities, including electrical work, water supply and sewerage system, air conditioning and ventilation.
3. Construction of the fishery training vessel.
4. Supply of training equipment.
5. Ocean and inland transport of materials and equipment.
6. Consulting services related to implementation design, support on tenders, and construction supervision.

2) The Malaysian Government will be responsible for the following phases:

1. Securing the construction site, removal of facilities and other obstacles on the site, and any required improvements.
2. Payment of all duties, commissions, and other charges in connection with customs clearance of imported materials and equipment.
3. Procedures for exempting Japanese nationals in Malaysia, who provide equipment or services in connection with project implementation, from all taxes and other surcharges.
4. Obtaining of all licenses, permits, and other privileges, as necessary for project implementation.

5. Defray the costs of effective maintenance and supervision of facilities being built under this grant-aid and obtain budgetary appropriations to cover the preparation and costs of the necessary fencing, landscaping, equipment, furniture, and fixtures.

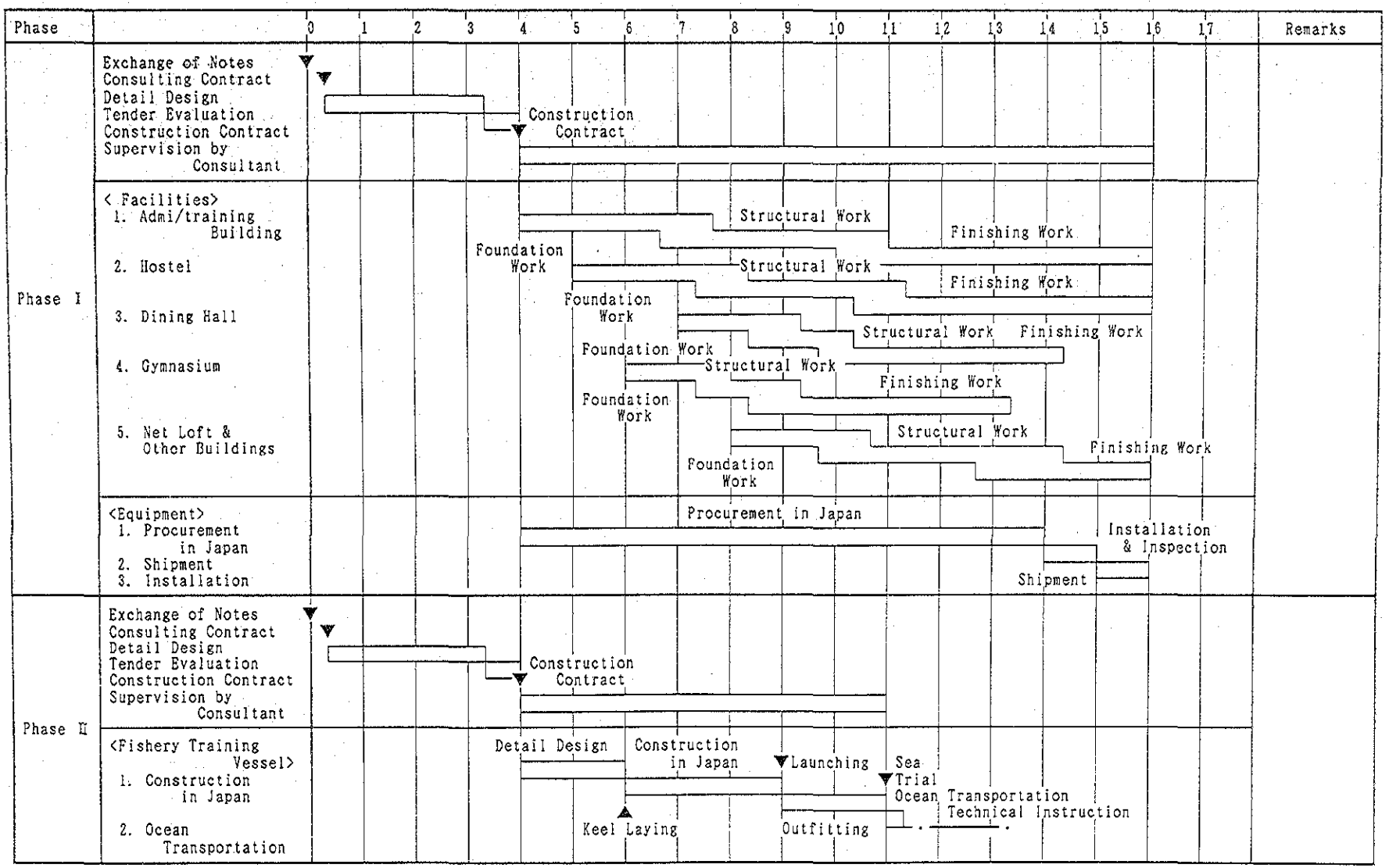
4.7.6 Implementation Schedule:

The Project will comprise two phases. The first phase will cover the construction of facilities and supply of training equipment and the second phase to include building of the training vessel.

An optimum construction schedule have been prepared, based on a careful analysis of each construction phase; a provisional plan classifying construction operations into those that should precede the main work, those that should be conducted in parallel, and those that can be implemented independently; and consideration of material procurement, construction period, and construction costs.

The integrated project flowchart is as shown on the following page.

PROJECT FLOW CHART



CHAPTER FIVE: PROJECT EVALUATION AND CONCLUSIONS

5.1 Project Evaluation:

5.1.1 Evaluation of Existing Fishery Training Programs:

The fishery training programs presently being carried out separately at Penang and Terengganu were launched in 1983. Until the programs started to be directed primarily at fishermen, graduates of the institutes had a choice of working in the coastal fishery, the Department of Fisheries, Fisheries Development Authority, or an industry other than fishing. This was because the Fisheries Training Institute was designed to conduct 2-year specialized fishery training programs geared at junior high school graduates, and so it was only natural that the career path of graduates would be oriented to positions with good working conditions, in which they could utilize their specialized training.

Of the 497 trainees graduating from the Penang center from 1972- 82, it is understood that 165 have gone into fields other than fisheries, 136 have found employment in the Department of Fisheries or LKIM, while the remaining 188 are working as coastal fishermen. Since 1983, the Training Institute has been directed at fishermen and so their first jobs upon completion of the training have been in the coastal fisheries. Since the opening of the deep-sea fishery courses in 1988, 55 trainees have been drawn from offshore fishing vessels.

A follow-up survey has been conducted to determine the career paths of the graduates of the 15 short-term courses at the branch ILPM at Terengganu from January 1985 through June 1986. The findings show that of 44 respondents, 33 were working as fishermen, while the remaining 11 were working on shore, in the military, or as seasonal laborers, indicating that about 75% of the graduates from this center have continued to be employed in the fishing industry.

11 respondents, at the time of the survey, were earning $300 or more per month and 27 less than $300. However, considering that the average age of respondents was in the 20's, the income levels reported by these graduates were by no means low by fisherman standards. This point is

underscored by the fact that 35 of the 44 respondents stated that their training at the center had proved useful.

While the Terengganu center offers short-term courses in both navigation and engine, fishermen felt that the engine course was more effective. This may be attributed to the fact that the skills acquired through the engine course in engine handling and repairs can be communicated to other members of the fisherman's family and also qualify the fisherman to repair engines on other vessels, whereas, in the case of the navigation course, it is difficult to transmit the technique to others other than through actual navigation practice.

Judging by the enthusiastic evaluations of course content received from the institute graduates, it may be concluded that the training provided at the existing centers is useful in improving the technical skills of fishermen.

5.1.2 Fisheries Education in Malaysia and ILPM:

Under the Malaysian educational system, after completing six years of primary school and three years of junior high school, students are given the option of pursuing a two-year senior high school course of study in either an academic, technical, or vocational program. The technical high schools place major emphasis on science and technology, offering programs in four areas; mechanical engineering, civil engineering, commerce, and agriculture, with nine such schools in operation as of 1986.

The vocational schools also offer four courses; technology, commerce, agriculture, and home economics. There are 45 vocational schools in all, conducting a total of 788 classes. In the 5th Malaysian Plan, the need is explicitly recognized to strengthen and broaden vocational education, and it was planned to increase the number of vocational schools to 68 by 1990. If this goal is achieved, enrollment at these schools, which numbered about 15,000 students in 1986, would double to 30,000. This would then comprise 8.2% of the nation's total high school students.

Engineering graduates of senior high schools may select to go on to either a 2-year college preparatory course or a 3-year engineering

school. Malaysia has 7 universities, including 6 national universities and the International Islamic University. Two of the national institutions are full universities, while the others are, respectively, devoted to natural science, agriculture, engineering, and economics. Total university enrollment is 49,000 students.

In Malaysia, opportunities for formal fishery education are extremely limited. As shown above, there is no secondary education available in the fisheries field, while, at the university level, the only specialized fishery program is being given at the Faculty of Marine Fisheries at the Agriculture University of Malaysia.

Apart from formal schools, there are various types of vocational training facilities in Malaysia operated by such agencies as the Ministry of Labor and Manpower, MARA, and the Ministry of Culture, Youth and Sports. Almost all of these facilities are oriented to technical training in such fields as mechanical engineering, electrical training, and vehicle maintenance. In the fisheries area, the Department of Fisheries in the Ministry of Agriculture has been operating Fishery Training Institute for a number of years. Considering the fact that there is no opportunity for fishery studies at the secondary school level and that fishery training is not offered at vocational centers, the existing Fishery Training Institute is, in effect, the sole sources of technical training for ordinary fishermen and so is playing a vital role in this sector.

5.1.3 Fishery Development and Fishery Training:

Based on the research on Malaysia's exclusive economic zone conducted in 1985-87, considerable development potential has been identified for the pelagic resources off the east coast of Peninsular Malaysia. Assuming appropriate resource management, the maximum sustainable yield (MSY) from these pelagic resources, including small tunas, amounts to some 117,000 tons, double the 1988 catch by purse-seine vessels of 40 grt or over.

The Government's fishery development policies are naturally intended to divert fishing effort from coastal areas, where the problem of resource depletion has become quite real, to the development of the offshore fishery. However, the coastal fishery, which has formed the core of the

country's fishing industry to date, is sustained by a large number of artisanal fishermen, and so raising the income and social levels of these coastal fishermen remains a key subject that will have to be continually addressed within the context of future fishery policies.

In order to improve the social status of coastal fishermen, it will be necessary for the Malaysia Government to adopt measures, based on long-term policies, such as the diffusion of basic education. One of these, in our view, is the need to make the country's population aware of the importance of the fishing industry as a producer of animal proteins. But, in order to provide high-quality animal proteins at low cost to the growing population, the public must be made to understand that the fishing industry is not simply a natural exploitative industry, relying merely on experience and instinct, but is one that can become productive only on the basis of technology supported by scientific knowledge and specialized equipment and instruments and by providing the know-how to maintain a bio-environment capable of sustaining continuous production. Once fishing is recognized by the public as an industry, we may expect a greater effort on the part of fishermen themselves toward technical innovation as well as an influx of new human resources into the fishing industry.

The development of offshore fisheries, which represents a new area for the Malaysian fishing industry, will require the infusion of new technology and capital from outside the ranks of the coastal fishery. The technical innovation and capital resources required to build a successful offshore fishery are, in fact, tasks that must be carried out by private initiative; the government's work should be devoted mainly to the development of manpower and proper resource management for this fishery. If the Fishery Training Institute envisaged in the target Project can turn out graduates with the skills to function in the offshore fishery, the latter can presumably develop naturally into a new industry through the vitality of private economic activity.

Coastal waters in Malaysia are assured of high productivity by the constant replenishment of nutrient salts by limnological inflow. Based on the favorable economic conditions arising from the formation of fishing grounds close to shore, the coastal waters are felt to offer the most

favorable base for fishery production. From this standpoint, although the coastal fisheries under the present conditions are fraught with the problems of resource depletion and raising the social status of fishermen, if the Government is able to develop suitable fishing regulations and provides guidance and assistance to fishermen, it should be possible to position the coastal fishery too as an industry supplying animal protein. To achieve this end, there is a need for officials of the Department of Fishery to acquire the technology and knowledge to enable them to win the confidence of fishermen, and so continuing training facilities that will provide this new technology and experience are indispensable in this connection.

The immediate objectives of the Fishery Training Institute will be to modernize the country's fisheries through the upgrading of fishermen's skills and a broadening of administrative services via improvement in the technical competence of officials with the Department of Fisheries. We feel, therefore, that the Fishery Training Institute has a key role to play in the development of a fishing industry in Malaysia that is well balanced between the coastal and offshore sectors.

Based on the above considerations, implementation of this Project will, in our judgment, improve the efficiency of operations at the Fishery Training Institute, the only facility available to ordinary fishermen, while the raising of skill levels among fishermen and the strengthening of administrative support services will bring major benefits to Malaysian fishermen through an increase in fishing income and an improvement in their social position.

5.2 Conclusions

Judging from the size of the fishery resources within the Malaysian 200-mile zone, we can readily understand why the priority in the nation's fishery development program has been placed on the development of the pelagic resource off the east coast of Peninsular Malaysia. Fishery training has a long history in Malaysia, and the existing Fishery Training Institute has built up a good track record. However, with fishery development expected to be concentrated in east coast waters pursuant to official policy, along with the relocation of other

governmental facilities in the fisheries field to the east coast area, the Project for Modernization of Fisheries Training Institute has been drafted, under which a new Fisheries Training Institute is to be built in Chendering, Terengganu State to take the lead in modernizing Malaysia's fisheries and improve the effectiveness of its fishery training programs. Chendering, the Project area, has developed into the largest fishing port on the east coast and is considered an excellent environment for fisheries training. The Project site is level and the soil conditions present no problems. While it must be recognized that oceanographic conditions are inferior to those on the west coast during the northeast monsoon season, this does not means that on-vessel training will be impossible during these months.

In Malaysia, where opportunities for specialized fisheries education are extremely limited, the planned Fisheries Training Institute will function as the only training facility in this field that is open to ordinary fishermen and, as such, can be expected to contribute to the boosting of fishermen incomes through technical training. Since this new institute is basically intended to carry on the training syllabus of the existing facilities, the existing organizational structure, including instructors, and budgets can be transferred to the new facility in their present form. In addition, increased training efficiency can be anticipated from the planned consolidation of the two existing facilities, and so we see no problems in facility operation or maintenance. A firm plan is already in place to convert the existing training facilities into regional fisheries extension centers once the new institute gets underway. Accordingly, the appropriateness of the target Project has been amply validated.

Malaysia is endowed by oil, tin, and other natural resources and has been successful in rapidly industrializing its economy, while per-capita incomes are high. However, in the fisheries sector, it has been possible to date to expand catches on the basis of the abundant coastal resources, and, as a result, development in this industry has lagged behind that in agriculture or forestry. In order to modernize the fishing industry into one that can supply high-quality animal proteins to the growing population by utilizing the abundant untapped resources that have been confirmed in the waters off the east coast of Peninsular Malaysia, Sabah, and Sarawak, it is particularly vital that technical skill levels be

improved among the fishermen population with a view to raising their incomes by increasing the volume and added value of their catches. The role of the Fisheries Training Institute in this connection is highly important, and we have, therefore, concluded that there is considerable significance in implementing the target Project through grant-aid from Japan.

APPENDIX

I Minutes of Discussions

I-1 Field Survey

I-2 Draft Report Explanation

II Team Members

III Survey Itinerary

IV Discussants

V Annex

1. Results of Economic Viability Study of Deep Sea Fisheries
2. Condition of Existing Training Vessels
3. Boring Log
4. Training Vessel BHP Curve
5. List of Equipment
6. Leading Particulars of Training Vessel

I Minutes of Discussions

I-1 Field Survey

MINUTES OF DISCUSSIONS

ON

THE PROJECT FOR MODERNIZATION OF FISHERIES TRAINING INSTITUTE

IN

MALAYSIA

In response to the request of the Government of Malaysia, the Government of Japan decided to conduct a basic design study on the Project for Modernization of Fisheries Training Institute and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to Malaysia the Study Team headed by Mr. Tadashi Tsuchiya, Deputy Director, Office of Overseas Fisheries Cooperation, Oceanic Fisheries Department, Fisheries Agency, Ministry of Agriculture, Forestry and Fisheries, from November 30 to December 22, 1989.

The team had a series of discussions on the Project with the officials concerned of the Government of Malaysia headed by Dato' Shahrom Hj. Abdul Majid, Director-General of Fisheries, Malaysia and conducted a field survey in Chendering, Terengganu and Pulau Pinang.

As a result of the study, both parties agreed to recommend to their respective Governments that the major points of understanding reached between them, attached herewith, should be examined towards the realization of the Project.

December 8, 1989

TADASHI TSUCHIYA
Team Leader
JICA

DATO' SHAHROM HJ. ABDUL MAJID
Director-General of Fisheries,
MALAYSIA.

Attachment

1. Objective of the Project

The objective of the Project is to train and upgrade the skill of Malaysian fishermen and staff concerned for developing its deep-sea fisheries.

2. Executing Agency

The executing agency is the Department of Fisheries, Ministry of Agriculture, Government of Malaysia.

3. Request of the Government of Malaysia

The contents of the Project required by the Government of Malaysia are listed in Annex 1. The Team will convey the request of the Malaysian Government to the Japanese Government that the latter will take the necessary measures to cooperate by providing the items listed in Annex 1 within the scope of the Japan's Grant Aid Program.

4. Project Site

The site of the Project is located at Chendering, the State of Terengganu, as shown in Annex II. In addition the Government of Malaysia indicated the possibilities of expanding the site for the purpose of providing better conditions for execution of the training.

5. Undertaking of the Government of Malaysia

The Government of Malaysia will take necessary measures listed in Annex III on condition that the Grant Aid of the Government of Japan would be extended to the Project.

6. Utilization of the Existing Facilities

The Government of Malaysia has confirmed that the existing training facilities in Pulau Pinang and Kuala Terengganu would be converted to the Fisheries Extension Centres based on the established extension program by the Department of Fisheries.

7. Understanding of Japan's Grant Aid System

The Malaysian Government has understood Japan's Grant Aid System explained by the Team which includes a principle of use of a Japanese consulting firm and a Japanese firm for the construction.

8. Two-Year Training Course

The Malaysian Government proposes to conduct a two-year course leading to Certificate of Competency. The Team takes note of this proposal; however, it recommends that the Government should attempt to generate employment opportunities before implementing such course.

9. Technical Cooperation

The Government of Malaysia requests a technical cooperation to formulate the training program and course contents for the Project, and the Team will convey its request to the Government of Japan.

ANNEX 1

The necessary facilities and equipment for providing the fisheries training for 150 resident trainees at any one time, are for the following courses:-

(1) Navigation Course - 5 months
(2) Engineering Course - 5 months
(3) Deep Sea Fishing Course - 5 months
(4) Navigation Modular Course - 3 weeks
(5) Engine Modular Course - 3 weeks
(6) Induction Course For Staff - 5 months
(7) Fishing Gear Technology Course For Staff - 4 months

(A) Facility

Classrooms;
Training rooms including navigation, radio, chart work, fish handling, net loft and workshop;
Administration block;
Assembly hall;
Dormitory for trainees;
Maintenance workshop.

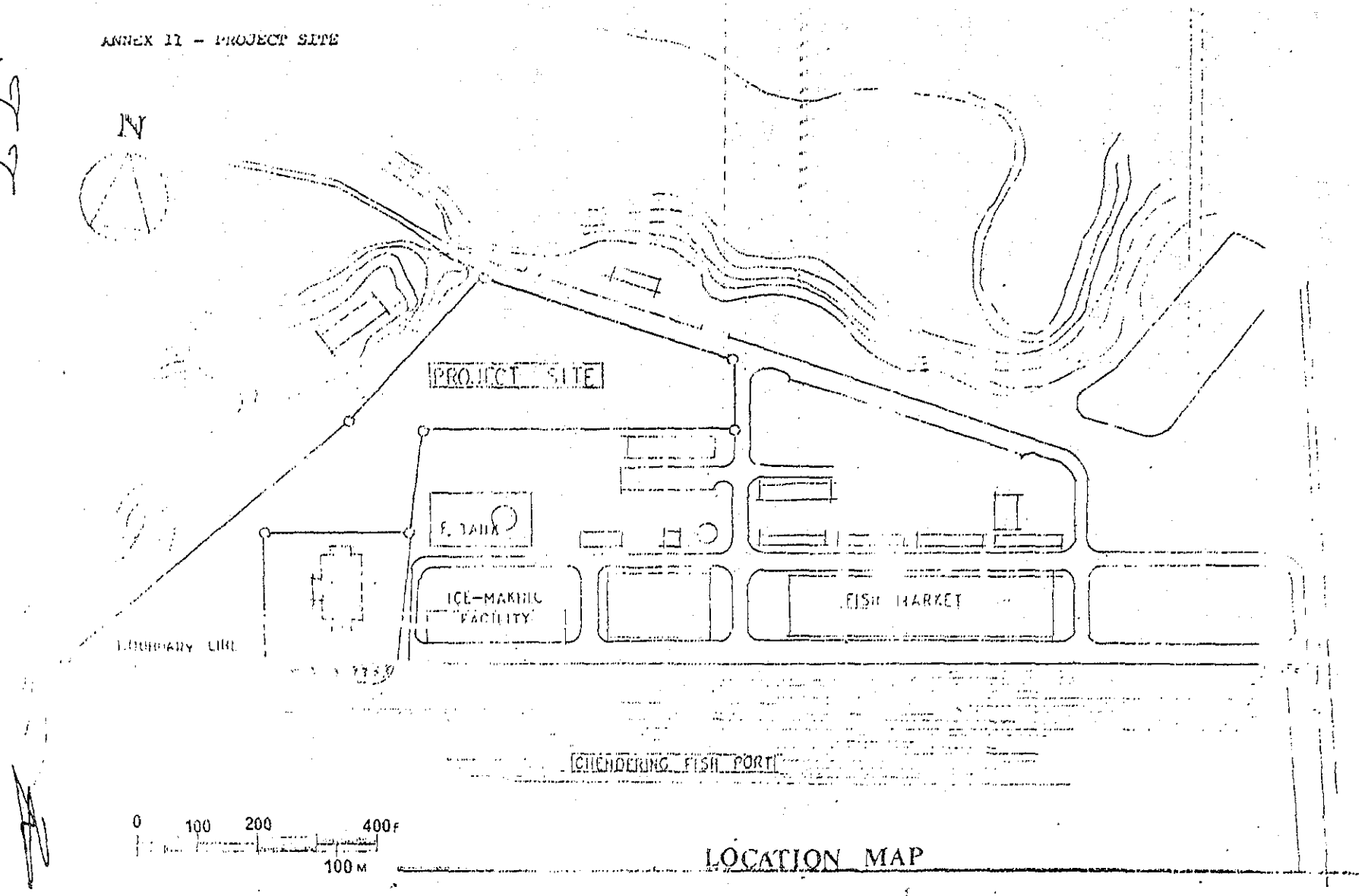
(B) Training Vessel

Vessel type - stern trawler or purse seiner
Complement - Approximately 20 persons including minimum 10 trainees
Training period - Approximately 5 days.

(C) Equipment

Equipment for the navigation training
Equipment for the engine training
Equipment for fishing gear training
Equipment for the radio communication training
Machine tools
Vehicles
Others.

ANNEX II - PROJECT SITE



LOCATION MAP

ANNEX III

UNDERTAKING OF THE GOVERNMENT OF MALAYSIA

1. To secure cleared land to be used for the facility construction and berthing place for the training vessel.

2. To provide facilities for distribution of electricity, water supply, sewage and other incidental facilities to the site of the facility construction.

3. To ensure prompt unloading and custom clearance at the port of disembarkation in Malaysia and to secure that the Japanese nationals shall not be subject to any custom duties, internal taxes and other fiscal levies imposed in Malaysia, with respect to the supply of materials and services under the verified contracts.

4. To accord Japanese Nationals whose servises may be required in connection with the supply of products and the services under the verified contract and such facilities as may be necessary for their entry into Malaysia and stay therein for the performance of their work.

5. To provide quarters for essential Malaysian staff necessary for the execution of the Project.

6. To maintain and use properly and effectively the facilities, equipment and vessel, purchased under the grant.

7. To bear all the expenses other than those to be borne by the grant, including operation and maintenance budget for the facilities.

MINUTES OF DISCUSSIONS ON THE PROJECT FOR MODERNIZATION OF FISHERIES TRAINING INSTITUTE IN MALAYSIA

In response to the request of the Government of Malaysia for the project for modernization of Fisheries Training Institute Malaysia (hereafter referred to as "the Project"), the Government of Japan decided to conduct a basic design study on the Project and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to Malaysia the study team headed by Mr. Tadashi Tsuchiya, Deputy Director, Office of Overseas Fisheries Cooperation, Oceanic Fisheries Department, Fisheries Agency, Ministry of Agriculture, Forestry and Fisheries, from November 30 to December 22, 1989.

As a result of the study, JICA prepared draft final reports and despatched a team headed by Mr. Junichi Fujita, Deputy Director, International Affairs Division, Fisheries Agency, Ministry of Agriculture, Forestry and Fisheries to explain and discuss them with the relevant officials of the Government of Malaysia headed by Dato' Shahrom B. Hj. Abd. Majid, Director General of Fisheries, Ministry of Agriculture, from March 22 to March 29, 1990.

Both parties had a series of discussions on the report and agreed to recommend to their respective governments that major points of understanding reached between them, attached herewith, should be examined toward the realization of the Project.

March 27, 1990

藤田純一

MR. JUNICHI FUJITA
Team Leader
JICA.

DATO' SHAHROM B. HJ. ABD. MAJID
Director-General of Fisheries,
MALAYSIA.

ATTACHMENT

1. The Malaysian side in principle agreed to the basic design proposed in the draft final report with the necessary amendments.
2. The Malaysian side has understood Japan's grant aid system and the necessary measures, mentioned in ANNEX III of the Minutes of Discussions dated on December, 8, 1989, to be undertaken by them for the realization of the Project.
3. The Malaysian side has confirmed that necessary budget will be provided for the Project for its effective operation and maintenance.
4. The JICA team has understood the request of the Malaysian side that they hope to finish reviewing present curriculums with the assistance of a Japanese expert before this institute becomes operational. The JICA team will convey this request to the Government of Japan so that they can find an appropriate expert.
5. The JICA team stated that the final report (10 copies in English) would be submitted to the Malaysian side by the end of July, 1990.

J.F

Appendix II. Team Members

II-1 Field Survey

Mr. Tadashi TSUCHIYA	Team Leader	Deputy Director, Office for the Overseas Fisheries Cooperation, Oceanic Fisheries Dept., Fisheries Agency, Ministry of Agriculture, Forestry and Fisheries
Mr. Hidemitsu SAKURAI	Project Coordination	2nd Basic Design Study Div., Grant Aid Planning and Survey Dept., Japan International Cooperation Agency (JICA)
Mr. Toshiya OGASAWARA	Architectural Planning	Fisheries Engineering Co., Ltd.
Mr. Naohiko NAKAJIMA	Fisheries Training Program	Fisheries Engineering Co., Ltd.
Mr. Takeshi HARA	Building Equipment	Fisheries Engineering Co., Ltd.
Mr. Kanji YOSHIMI	Fishing Vessel	Fisheries Engineering Co., Ltd.
Mr. Mitsuo IGARASHI	Environmental Survey	Fisheries Engineering Co., Ltd.

II-2 Draft Report Explanation

Mr. Junichi FUJITA	Team Leader	Deputy Director, Office for the Overseas Fisheries Cooperation, Oceanic Fisheries Dept., Fisheries Agency, Ministry of Agriculture, Forestry and Fisheries
Mr. Ryota ONO	Project Coordination	Procurement Division Japan International Cooperation Agency (JICA)
Mr. Toshiya OGASAWARA	Architectural Planning	Fisheries Engineering Co., Ltd.

Mr. Naohiko NAKAJIMA	Fisheries Training Program	Fisheries Engineering Co., Ltd.
Mr. Kanji YOSHIMI	Fishing Vessel	Fisheries Engineering Co., Ltd.

Appendix III Survey Itinerary

III-1 Field Survey

GO : Government Officials (Team Leader, Project Coodination)
C1 : Architectural Planning, C2 : Fisheries Training Programme,
C3 : Building Equipment, C4 : Fishing Vessel, C5 : Environmental Survey

DAY	DATE	DESCRIPTION	
1	Nov. 30 (Thu)	GO, C1, C2, C3, C4 : Lv. Narita, Ar. Kuala Lumpur (KL)	
2	Dec. 1 (Fri)	GO, C1, C2, C3, C4 : Visits to Embassy of Japan, JICA Office , Depertment of Fisheries Presentation of Inception Report	
3	Dec. 2 (Sat)	GO, C1, C2, C3, C4 : Lv. KL, Ar. Kuala Terengganu (KT) Visit to State Secretary and State Dept. of Fisheries	C5 : Lv. Narita Ar. Kuala Lumpur
4	Dec. 3 (Sun)	Visit to ILPM, Terengganu Discussion with State Dept. of Fisheries	C5 : Lv. KL Ar. KT
5	Dec. 4 (Mon)	GO, C1, C2, C4 : Visit to the site and dockyard	C3, C5 :
6	Dec. 5 (Tue)	Discussion with ILKM and fishermen Lv. KT, Ar. KL	Field Survey
7	Dec. 6 (Wed)	Lv. KL, Ar. Penang Visit to ILPM	Construction site survey
8	Dec. 7 (Thu)	Discussion with ILPM Lv. Penang, Ar. KL Discussion with DOF	Boring supervision Data collection, etc.
9	Dec. 8 (Fri)	Discussion with DOF and signing of Minutes of Discussions	
10	Dec. 9 (Sat)	C1, C2, C4 : Visit to DOF	
11	Dec. 10 (Sun)	Discussion within the team	

DAY	DATE	DESCRIPTION		
12	Dec. 11 (Mon)	G0 : Visit to Embassy of Japan, JICA Office Lv. Kuala Lumpur	C1, C2, C4 : Visit to CIAST, Shah Alam	C5 : Field Survey - continued -
13	Dec. 12 (Tue)	G0 : Ar. Narita	C1, C2, C4 : Visit to Kuantan	C3 : Lv. KT Ar. KL
14	Dec. 13 (Wed)	C1, C2, C3, C4 : Visit to ALAM, Melaka		
15	Dec. 14 (Thu)	Lv. KL, Ar. Penang Visit to ILPM	C5 : Lv. Kuala Terengganu Ar. Kuala Lumpur	
16	Dec. 15 (Fri)	Discussion at ILPM	Data Collection	
17	Dec. 16 (Sat)	Discussion at ILPM Lv. Penang, Ar. KL	Lv. Kuala Lumpur 10:45 (CX-720) Ar. Narita 21:15	
18	Dec. 17 (Sun)	C1, C2 Lv. KL, Ar. KT Visit to relevant authorities	C3, C4 Discussion within the team	
19	Dec. 18 (Mon)	Visit to Merang District Office Survey on construction materials	Visit to Embassy of Japan, JICA Office	
20	Dec. 19 (Tue)	Field confirmation of the site Lv. KT, Ar. KL	Lv. Kuala Lumpur Ar. Narita	
21	Dec. 20 (Wed)	Visit to DOF Survey on construction industry		
22	Dec. 21 (Thu)	Discussion at DOF Supplementary data collection, Visit to Embassy of Japan and JICA Office		
23	Dec. 22 (Fri)	Lv. Kuala Lumpur, Ar. Narita		

III-2 Draft Report Explanation

1	Mar. 22 (Thu)	Lv. Narita, Ar. Kuala Lumpur
2	Mar. 23 (Fri)	Visit to Embassy of Japan and JICA Office Visit to DOF and presentation of Draft Report Explanation of the draft report
3	Mar. 24 (Sat)	Discussion within the team
4	Mar. 25 (Sun)	Discussion within the team
5	Mar. 26 (Mon)	Discussion with DOF on the draft report
6	Mar. 27 (Tue)	Discussion with DOF on the draft report Discussion and signning of the Minutes Visits to Embassy of Japan, JICA Office
7	Mar. 28 (Wed)	Collection of supplementary data and information
8	Mar. 29 (Thu)	Lv. Kuala Lumpur Ar. Narita

Appendix IV Discussants

IV-1 Field Survey

NAME	TITLE AND/OR ORGANIZATION
Wan Norma Wan Daud	Assistant Director, External Assistance Section, EPU
Badaruddia Mahydin	Assistant Director, EPU
Zulkefli A. Hassan	Principal Assistant Secretary, MOA
Dato' Shahrom Abd. Majid	Director General, DOF, KL
Mohd Mazlan Jusoh	Deputy Director, DOF, KL
Rabihah Mohmood	Head of Planning, DOF, KL
Gan Bon Hua	Chief, Development Section, DOF, KL
Chen Shih Hsie	Director of Technology, DOF, KL
Tan Cheng Kiat	Director, Extension and Training Section, DOF, KL
Johari Ramli	Fisheries Officer, DOF, KL
B. Balachandran	Director, ILPM
P. Gangaram	Fisheries Officer, Marine Extension Section, DOF, KL
Junaidi Che Ayub	Deputy Director, ILPM
Fauzi Abdul Rahman	Head of Fishing Gear Section, ILPM
Zainal B. Mohamad Top	Head of Navigation Section, ILPM
Abu Hassan b. Yasin	Acting Head of Fish Handling Section, ILPM
Yap San Then	Senior Assistant Fisheries Officer, ILPM
Zulkifli Jumat B. Abd-Majd	Technical Assistant, ILPM
Zulkipli b. Ahmad	Technical Assistant, ILPM
Aloysius Sim	Senior Assistant Marine Officer, ILPM
Dato' Abdul Rahman	State Secretary, Terengganu
Hussain bin A. Rahman	ILPM, Terengganu
Ismail Taufid B. Md. Yusoff	State Fisheries Department, Terengganu
Jamulus Mohamed Nor	State Fisheries Department, Terengganu

Masaru Tuji	First Secretary, Embassy of Japan
Toshiyuki Akagi	Second Secretary, Embassy of Japan
Akio Okabe	Resident Representative, JICA Malaysia Office
Yoshiro Minato	Deputy Resident Representative, JICA Malaysia Office
Kuniaki Nagata	Assit. Resident Representative, JICA Malaysia Office

VI-2 Draft Report Explanation

NAME	TITLE AND/OR ORGANIZATION
Wan Norma Wan Daud	Assistant Director, External Assistance Section, EPU
Kamariah Ramli	Pricipal Assit. Director, Agriculture Section, EPU
Ab. Gnaffan A. Tambi	Ministry of Agriculture
Dato' Shahrom Abd. Majid	Director General, DOF, KL
Rabihah Mohmood	Head of Planning, DOF, KL
Chen Shih Hsie	Director of Technology, DOF, KL
B. Balachandran	Department of Fisheries
Nik Ab. Wahab. b. Mat Diah	Department of Fisheries
Ching Kim Looi	Department of Fisheries
Ahmad Tarmidzi Ramly	Department of Fisheries
Hashim bin Almad	Department of Fisheries
Johari Ramli	Department of Fisheries
Ismail Taufid B. Md. Yusoff	State Fisheries Department, Terengganu
Junaidi Che Ayub	Director, ILPM
Toshiyuki Akagi	Second Secretary, Embassy of Japan
Akio Okabe	Resident Representative, JICA Malaysia Office
Yoshiro Minato	Deputy Resident Representative, JICA Malaysia Office

Kuniaki Nagata	Assit. Resident Representative, JICA Malaysia Office
Kazuo Okabe	Resident Representative, JICA Malaysia Office

APPENDIX V-1

RESULT OF ECONOMIC VIABILITY STUDY OF DEEP SEA FISHERIES IN PENINSULAR MALAYSIA

ITEMS	TRAWL FISHERIES	PURSE SEINE FISHERIES
Average size of vessel (grt)	90	87
Main Engine horse power (ps)	413	318
No of days per trip (days)	8	3
No of trips per year (times)	36	92
Total no of crew (person)	5	14
Landings per trip (kg)	7.213	3.360
Landed value per trip (M$)	8.019	3.965
Total landings per year (kg)	252.954	304.988
Total landed value per year (M$)	277.380 (1)	366.460 (1)
Fuel cost per year (M$)	66.954 (33.8%)	35.128 (13.0%)
Total provisions cost per year(M$)	5.760 (2.9%)	11.280 (4.5%)
Ice purchase per year (M$)	6.538 (3.3%)	21.760 (8.7%)
Lub oil cost per year (M$)	1.882 (1.0%)	1.020 (0.4%)
Salary per year (M$)	98.136 (49.4%)	148.668 (56.0%)
Maintenance cost per year (M$)	14.880 (7.6%)	16.500 (6.5%)
Cost for unjang per year (M$)	-	24.000 (9.3%)
Other expense (M$)	4.000 (2.0%)	4.000 (1.6%)
Total cost per year (M$)	198.150 (100%) (2)	262.356 (100%) (2)
Total variable cost per year	5.177	2.360
Annual Gross Profit (1) - (2) (M$)	79.230	104.104
Depreciation cost (M$)	29.460	37.800
Annual Net Profit (M$)	49.772	66.304
Internal Rate of Return (%)	16.72	20.09
Production cost per kg of catch ($/kg)	0.90	0.98

(Source: Deep Sea Fisheries Industry in Malaysia--Cost and Return Aspects for Boat Utilization of 70grt and above, Fisheries Department, Jul. 1989)

APPENDIX V-2 CONDITION OF EXISTING TRAINING VESSELS

There are at present 5 training vessels attached to the existing Fishery Training Centers. In addition, up to 1988, another research vessel belonging to the Fishery Research Laboratory had been used for training purposes, but this was returned in April, 1989. The condition of the existing training fleet is as shown below.

(1) K.L. KURAU:

This vessel was transferred to Malaysian registry from the FAO in 1972 and is now almost 20 years old. During this period, vessel maintenance has generally been excellent. Exterior work has included the replacement of outside planking and wooden decks, while timely repairs have been made to piping systems to equipment and cabins. However, dents in the steel decks, visible, for example, in the forecastle desk, amply attest to the vessel's advanced age, and so replacement cannot be deferred too much longer. Since this vessel was built as a multi-purpose ship, it has many deficiencies in terms of both the stern trawl and purse-seine fishing methods and is presently being used only for trawl operations.

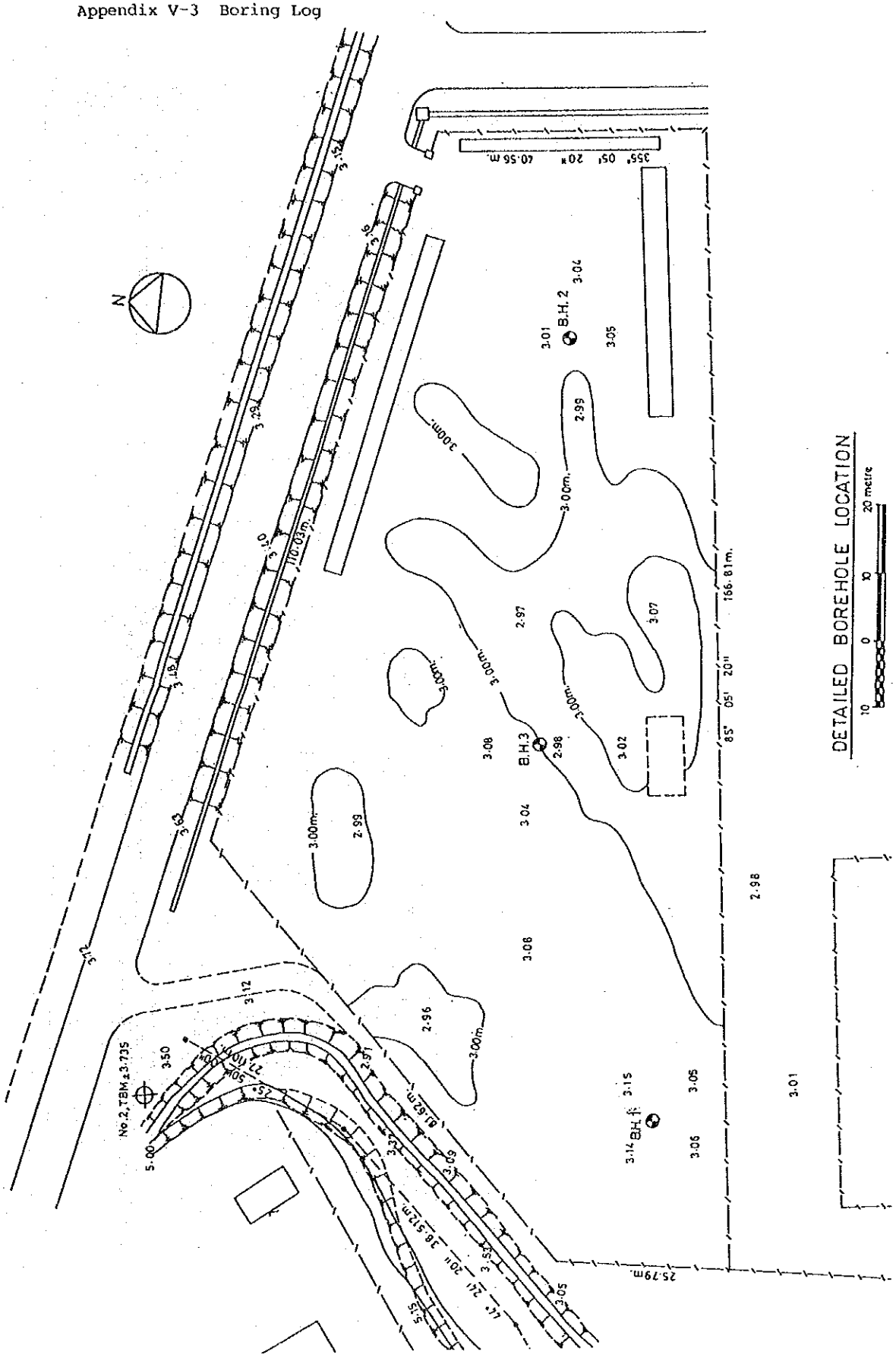
(2) K.L. BAWAL, KERAPU II, III, and V:

These vessels are all 16-18 years old but, owing to the wooden construction, repairs are simple and so the vessels have all been well maintained, while the rigging too is not complex. Thus, we anticipate no particular problems with these vessels and believe that they can continue to be used, for the time being, as training vehicles for the trawl fishery.

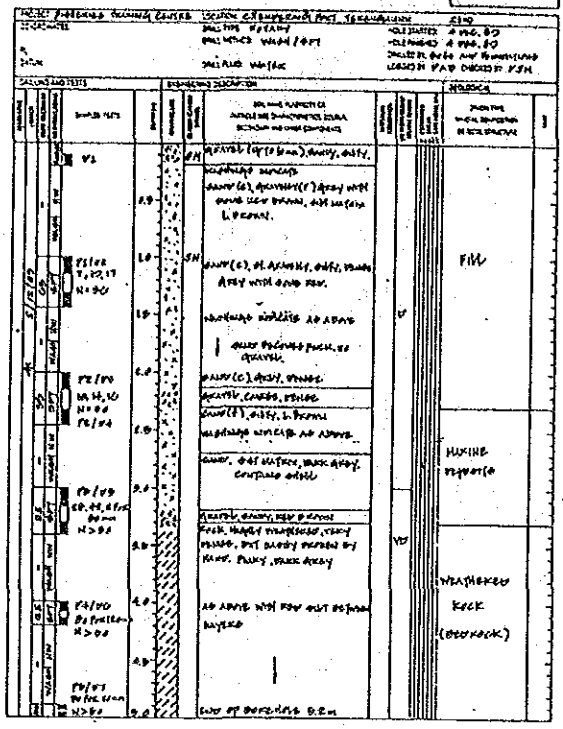
(3) K.K. MERSUJI:

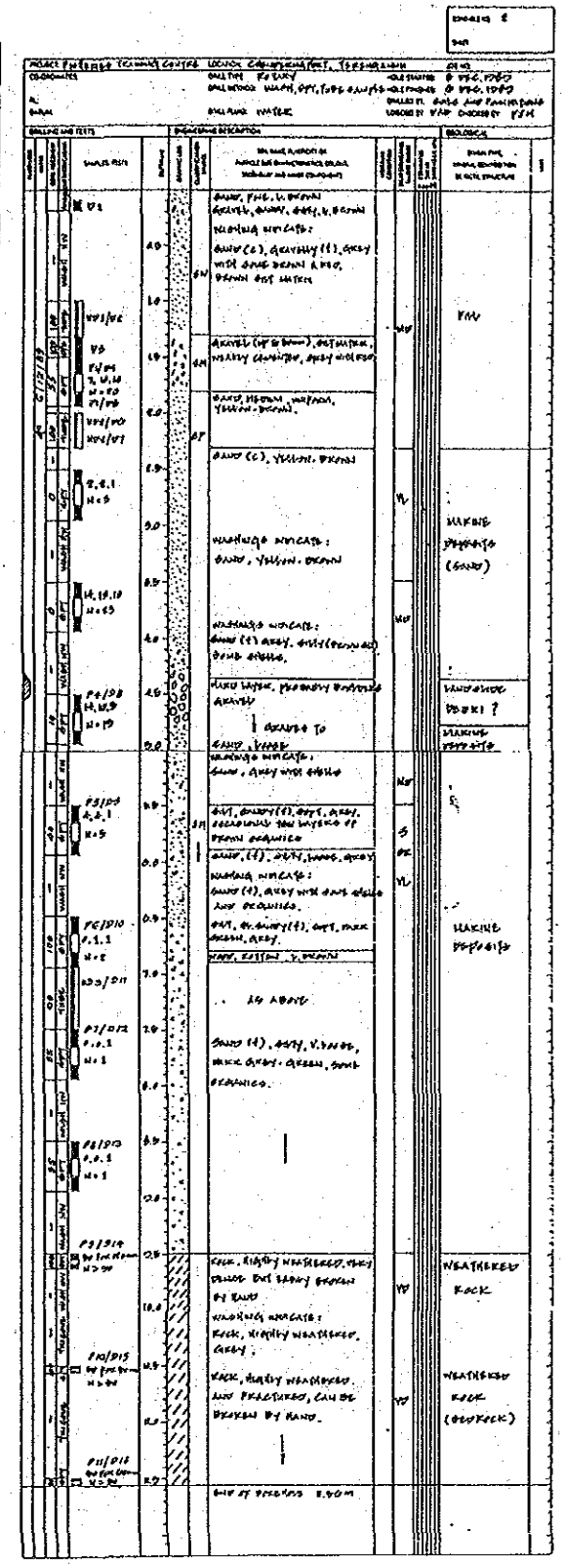
This vessel is presently being used as a fishery research vessel attached to the Fishery Research Laboratory in Penang. Although built as a multi-purpose vessel, like the Kurau, it is now being used solely for trawl operations. Purse-seine methods have been demonstrated by specialists on this vessel but, owing to its multi-purpose configuration, operations are more complicated than on a normal purse-seine vessel and so have not been fully understood.
Since this vessel is of FRP construction, it has the major advantage of being rust-proof, though the lack of adequate facilities and technology in the area prevents the repair of damage from scraping during mooring operations.

Appendix V-3 Boring Log



Boring Log





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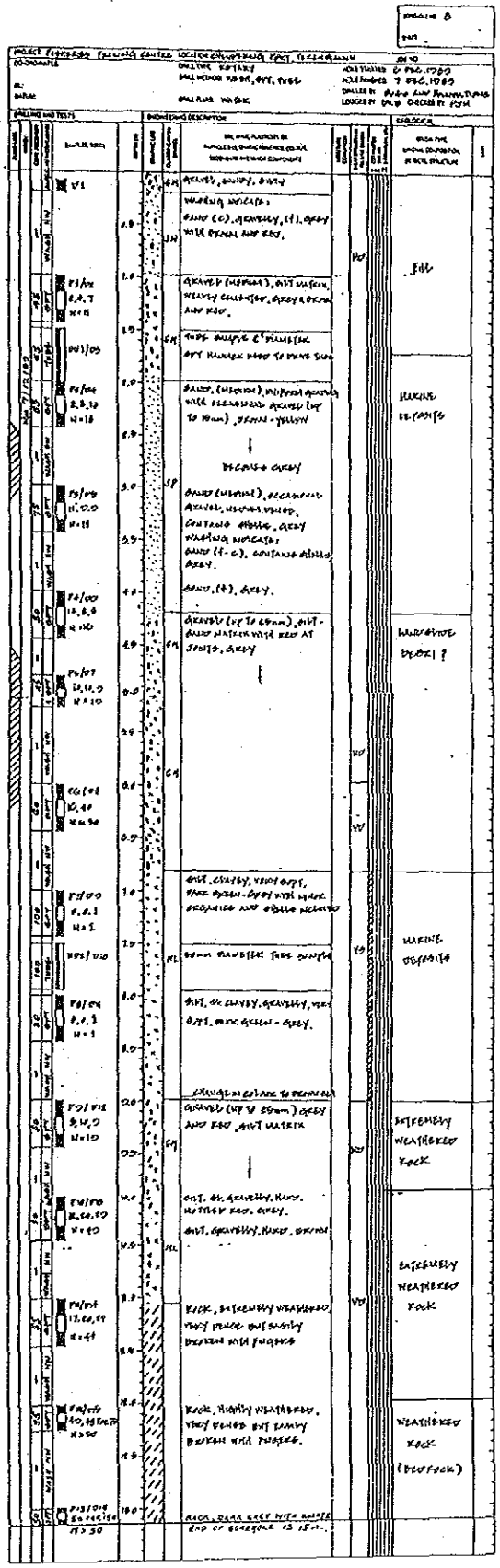
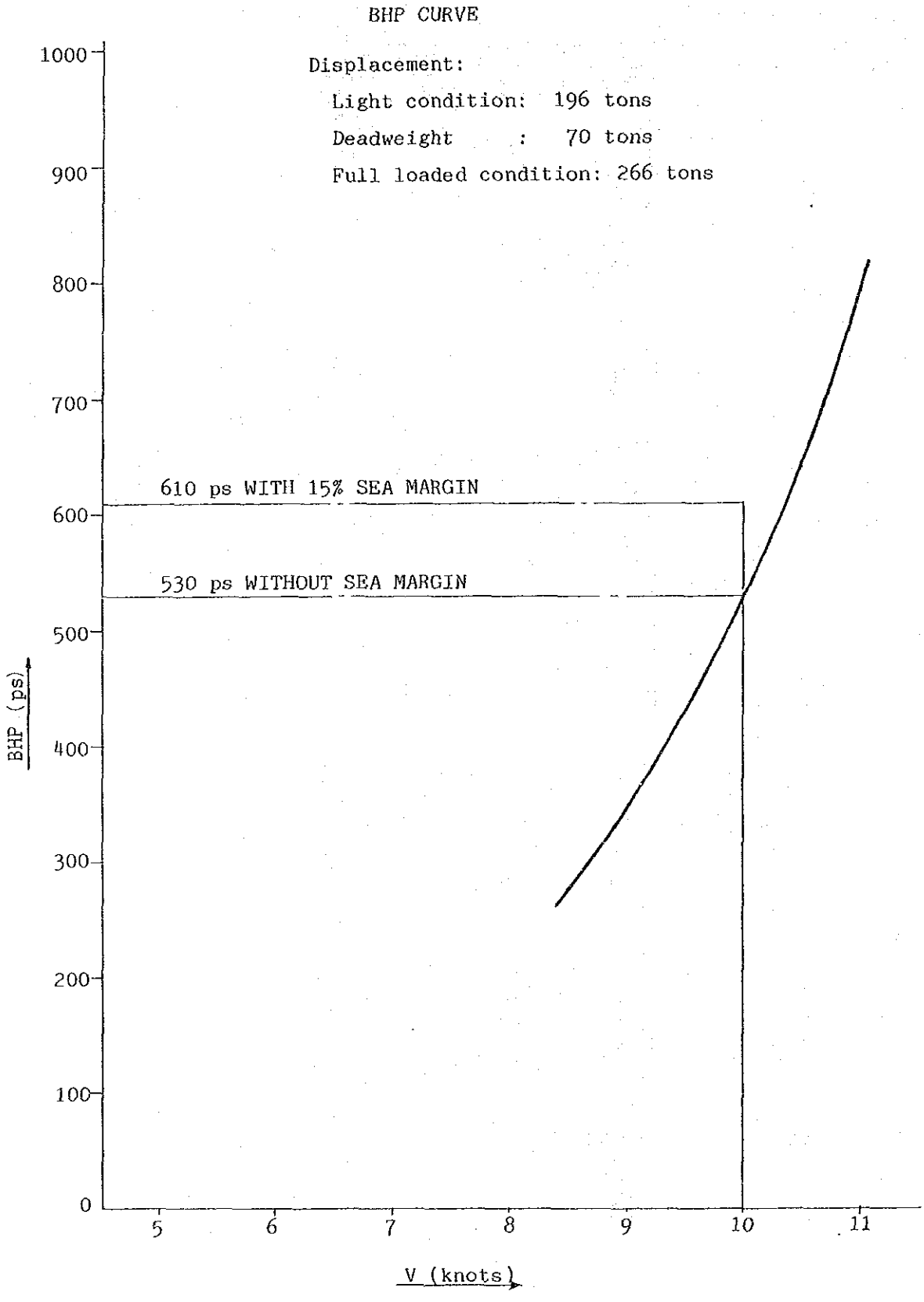


Appendix V-4 Training Vessel BHP Curve



Appendix V-5 List of Equipment

1. Navigation Training Equipment

Item	Outline of Spec.	Q'ty
Sextant		15sets
Magnet compass		15ps.
Chronometer		2ps.
Stopwatch		15ps.
Utensils for charting work	triangle, divider, etc.	15sets
Deviascope		1set
Collision preventing training board		1lot
Binoculars	with direction scales	5ps.
Steering gear training apparatus		1set
Echo sounder	recording type, two frequencies, with CRT display and playback device	1set
Sonar	CRT display, sector scanning	1set
Radar	Max. 64 miles range, 10kw output with playback system	2sets
Doppler log		1pc.
Direction finder		1pc.
GPS navigational aid		1pc.
Gyrocompass		1pc.
Anemometer	with recorder	1set
Barograph		1pc.
Weather facsimile receiver		1set
SSB radio telephone	150 W	1set
VHF radio telephone	25 W	1set
Walkie-talkie	with rechargeable batteries	2pair
SOS radio beacon		1pc
Life raft		1pc
Life jacket		5ps.
Daylight signaling search light		2ps.
Cutter boat	with 12 thwarts, FRP made	1pc

2. Engine Workshop Equipment

Marine Diesel Engine for Running Operation		
250ps	with starting, fuel supply and cooling devices, exhaust pipe	1pc
100ps	-ditto-	1pc
30ps	-ditto-	1pc
Marine Diesel Engine for Reassembling Use		
30ps		5ps.
Tools and equipment for above	1) Special tool dial gauges, micrometers, cylinder gauges, etc.	5sets
	2) Ordinary tool wrenches, drivers, clamps, ring gauges etc.	5sets
	3) Expendable items	

	O-rings, gaskets, elements packings, etc.	5sets
Cut Models		
Propeller shaft	for 30ps engine including propeller, stern tube, shaft	1set
Outboard engine	25ps gasoline engine	1set
Pumps	plunger, centrifugal, and gear types	1pc ea
Pump for Reassembling Use	plunger, centrifugal, and gear types	3ps.ea
General Tool for Maintenance Use	AC arc welder, gas welder bench drill, parts washing stand, battery charger, air compressor, etc.	1lot
Power Source Switch Panel	DC switching board for training use	1pc

3. Fishing Training Equipment and Materials

Sample fishing gear	gill net, nylon mono & multi filament, mesh size 30mm, 100m long	2ps.ea
	long line for tuna< main line 550m, branch line 15m x 10pc	2ps.
Sample materials	sinkers, floats, ropes, hooks, lures, swivels, etc.	1lot
Sample net	nylon and polyethylen, mono, multi & knotless, with 3 mesh sizes	1lot
Net repairing materials	netting, net needle, scissors	1lot
Net weaving materials	nylon twine 210d/12, 500g/roll	50rolls
Rope-work materials	knife, spike(wood, steel), rope	1lot
Wire cutter	manual type	2ps.
Electric winch	electric motor driven, with derrick, tackle and wire	1set
Mini power block	with hydraulic motor	1set
Line hauler	hydraulic driven	1set
Net hauler	hydraulic driven	1set

4. Fish Processing/Laboratory Equipment

(Fish Processing)		
Fish Carrying Box	Plastic, 850x520x200	40ps.
Insulated Box	Plastic, 692x540x455	20ps.
Fish Basket	Plastic, 392x341x190	30ps.
Trolley	Stainless, 1200x600x800	2ps.
Porter Lift	Steel,	1pc.
Processing Table	Stainless, 2500x1800x800	1pc.
Work Table	Stainless, 1800x750x800	2ps.
FRP Water Tank	w/caster, 1650x1120x760	1pc.
Sink	Stainless, 900x750x800	4ps.
Plastic Bucket	w/cover, dia.563x468	8ps.
Knives	Blade length 240	30ps.
Cooking Board	Plastic, 800x400x30	12ps.

(Surimi Equipment)		
Fish Cleaning Machine	Cap.30kg, batch type	1pc.
Meat Collecting Machine	press type, 950x650x1300	1set
Squeezer	Hand/oil pressure,	1set
Meat Chopper	230x570x410	1set
Fish Agitating Crusher	Cap.10kg, 900x520x1100	1set
Food Molding Machine	table top type	1set
Fryer	Gas heated, double pan type	1set
Table Spring Scale	2kg	1pc
Table Spring Scale	10kg	1pc
Vacuum Packing Machine	1500lit., 1065x800x1240	1pc
(Canning equipment)		
Table Spring Scale	500g	4ps.
Home Seamer	semi-automatic type	1set
Exhaust Box	direct heating 750x420x1250	1set
Vertical Retort	direct heating/steam	1set
Drying Cabinet	1000x1500x2250	1set
Smoke Generator	755x605x1780	1set
Steam Washer	550x510x675	1set
Silent Cutter		1set
Strainer		1pc
Cooker	55lit. 1165x700x770	1pc
(Analytic Devices)		
K-Value Measuring Apparatus	with recorder and pre-reactor	1set
K-Value Test Paper Kit	80pcs./set	40sets
Volatile Basic Nitrogen Determinater Apparatus		1set
Conway Water Activity Test Apparatus		1set
Infrared Moisture Tester		1pc
Dial Bimetallic Thermometer	For fish	5pcs.
Ph Meter	Table top type	1set
Salt Analyzer	Table top type	1set
Salinity Refractometer	Hand refractometer	2ps.
Jelly(Gel) Strength Tester	Table top type	1set
Multi Hardmeter	Handy type	1pc.
Sugar Refractometer	Hand refractometer	2ps.
Small Thermometer	For canning	2ps.
Vacuum Can Tester		1pc.
Can percussion Rod		5ps.
Laboratory Table	Center type, 3000x1500x800	1pc.
Laboratory Table	Side type, 1800x750x800	2ps.
Incubator	0 - 50°C	1set
Refrigerator	0 - 5°C for chemicals	1pc.
Simulator of Refrigerating Technique	For training	1set
Micro Kjeldahl Distillation	6-unit, Electric heating	2sets
Water Distilling Apparatus		1set
Heating Mantle		1pc.
Homogenizer		1set
Balance Table		1set
Balance	Electronic	1set
Aseptic Box		1pc

Digital Temperature Recorder	6-channel	1set
Draught Chamber	1200x750x2350	1set
Glass Wares and Utensils	Beaker, flask, pipet, etc.	1lot

5. Vehicles

Mini bus	seating capacity 24	2units
Wagon car	seating capacity 12 gasoline engine	1unit

6. Other General Equipment

(AVA equipment)		
Video Camera	auto focus, f=11 - 70mm	2ps.
Video Monitor	25 inch type	2ps.
Video Editing System	image s/n 50dB	1lot
Slide Projector	Rotary Slide Tray, 300w	2sets
Overhead Projector	250x250 stage size	5ps.
(Printing equipment)		
Photocopy machine	B5-A3 size, 25 sheets/min.	1set
Printing machine		1set
Word Processor	with spell check function	1set
Cutter	300mm wide, motor driven	1pc

Appendix V-6 Leading Particulars of Training Vessel

G-1	RULES AND REGULATIONS	:	All Japanese Maritime Regulations to be applied for this type of ship
			Rules and Regulations of the Classification Society
G-2	MATERIAL OF HULL CONSTRUCTION	:	Steel
G-3	CLASSIFICATION	:	NK, NS*(Fisheries Training), MNS*
G-4	DIMENSIONS		
	Length, over all	:	28,00 Meters, approx.
	Length, p.p.	:	24.00 Meters, "
	Breadth, mld.	:	7.20 Meters, "
	Depth, mld.	:	3.15 Meters, "
	Draft, full loaded	:	2.65 Meters, "
G-5	TONNAGE AND CAPACITIES		
	Gross tonnage	:	165 Tons approx.
	CAPACITIES:		
	Fish hold	:	20 M^3, approx.
	F. O. T.	:	25 M^3, "
	F. W. T.	:	8 M^3, "
	B. W. T (F.P.T.)	:	3 M^3, "
	(Aft B.W.T.)	:	8 M^3, "
G-6	COMPLELMENT	:	21, consisting of: 10 - Crews 1 - Instructor 10 - Trainees
G-7	SERVICE SPEED	:	10.0 knots approx. with 15% sea margin

G-8 DESIGN CONDITION

	Sea water temp.	Ambient temp.	Atmospheric temp.	Atmospheric pressure
Propelling machinery	34°C	45°C		760 mmHg
Auxiliary machinery	34°C	45°C		760 mmHg
Electric plant		45°C	35°C	
Air conditioning plant	34°C		35°C	

G-9 INVENTORIES AND SPARE PARTS

Inventories of hull, machinery and electric parts, and spare parts and special tools for all machinery and equipment shall be supplied by the Builder according to the Rule requirements and manufacturer-'s/Builder's standards.

H-1 DECK MACHINERY AND FISHING MACHINERY

1 -	Steering gear	Electro-hydraulic system, 1.5 t-m, 1.5 kw
1 -	Windlass	2.0 tons x 10 m/min. electric motor driven, 2-gypsy wheels & 2-warping heads
1 -	Purse winch	Main drum: 4.0 tons x 40 m/min. 18 mm. dia x 1,300m. long wire rope capacity Forward drum: 4.0 tons x 40 m/min. 18 mm. dia. x 800 m. long wire rope capacity
1 -	Power block	Net pull: 3000 Kg at 500 mm. p.c.d. Sheave torque: 750 Kg-m Net speed: 50 m/min. at 500 mm. p.c.d.

1 - Main boom topping winch: 1.5 tons x 20 m/min.

2 - Main boom vang winch : 1.5 tons x 25 m/min.

1 - Main boom cargo winch (double): 2.0 tons x 20 m/min.

2 - Aux. boom topping winch: 1.0 tons x 20 m/min.

2 - Aux. boom cargo winch: 1.0 ton x 20 m/min.

1 - Chorker winch: 2.5 tons x 25 m/min.

1 - Skiff adjusting winch: 2.5 tons x 20 m/min.

1 - Power block inhaul manual winch

1 - Tow line winch: 2.5 tons x 30 m/min.

1 - Purse davit, 1.3 ton-m, driven by hydraulic system

1 - Hydraulic pump unit, main engine driven

1 - Pump unit for purse davit and winch remote control driven by 11 Kw electric motor

1 - Skiff boat : Loa x B x D = 6.00m x 2.80m x 1.00m approx. with one set of 250 ps x 2,550 rpm approx. inboard engine

1 - Control console

1 - Purse winch controller

H-2 LIFE SAVING EQUIPMENT

2 - Inflatable type life raft, for 15 persons

21 - Life jacket, inflatable type

Other equipment : As per rule requirement

H-3 FIRE FIGHTING EQUIPMENT

Portable fire extinguisher: As per rule requirement

Fire main line : As per rule requirement

H-4 VENTILATION AND AIR CONDITIONING SYSTEM

2 - Engine room supply fan, 2.2 KW

1 - Engine room exhaust fan, 1.5 KW

1 - Galley exhaust fan, 0.2 KW

1 - Lavatory exhaust fan, 0.2 KW

Store, battery room and steering gear room: Natural ventilation

1 - Air conditioning system
Compressor: 7.5 KW
Fan: 2.2 KW

H-5 ACCOMMODATION

1 - Captain's single berth cabin

1 - Chief engineer's single berth cabin

1 - Instructors's single berth cabin

2 - Crews's double berth cabins

1 - Trainees's double berth cabin

H-6 GALLEY EQUIPMENT

1 - L. P. G. cooking range, 3-grills, 1-oven

1 - Elec. water boiler, 20 litres, 2 KW

3 - Electric rice cooker, 2.0 litres

1 - Elec. refrigerator, 350 litres

1 - Dressor with sink

1 - Cooled water drinking fountain

H-7 PAINTING

Shot blasting on hull steel material to average grade of SA2.5
Japanese chlorinated rubber paint for outside shell, and oleoresinous paint elsewhere in general.

H-8 REFRIGERATED PROVISION STORES

Volume of chambers and holding temperature:

Meat chamber: about 1.0 m^3, -18°C

Vegetable chamber: about 1.5 m^3, +4°C

Refrigerating plant: 1 - R-22 Ref. unit, driven by 0.75 kw elec. motor

H-9 FISH HOLDS

Each hold shall be equipped with chilled sea water circulating system. Desinged conditions shall be as follows:
Chilling capacity: 5 tons (from 34°C to 0°C)/16 hours
Inner liner of insulation in the holds shall be of marine use type-1 plywood coated with FRP lining on the inside surface.
The space between liner and hull structure, and partition wall in these spaces shall be filled with polyurethane foam of 125mm thick.

M-1 PROPULSION MACHINERY

Main diesel engine	MCO 720 ps x 900/1000 rpm approx. Fresh water cooled One(1) set
Remote control system	Electric or electro-pneumatic type, controlled in wheel house
Propeller	4 bladed fixed pitch propeller

M-2 ELECTRIC GENERATING PLANT

Main diesel generator	100 ps x 1,500 rpm approx. Fresh water cooled Two(2) sets

M-3 AUXILIARY MACHINERY

Main air compressor	1 - electric motor driven
Aux. air compressor	1 - 3.5 ps diesel engine driven
Oily water separator	1 - 0.25 M^3/hr with bilge pump
Fuel oil purifier	1 - 700 litres/hr,1.5 kw

L.O. filter, main engine 1 - 350 l/hr

L.O. filter, gen. engine 2 - 100 l/hr

Fresh water sterilizer 1 - 500 litres/hr

Pumps:

1 - main engine cooling fresh water pump, electric motor driven

1 - aux. main engine lub. oil pump, electric motor driven

1 - aux. red. gear lub oil pump, electric motor driven

1 - fuel oil transfer pump, 10 M^3/20m, 3.7kw

1 - fuel oil service pump, 3 M^3/20m, 1.5kw

1 - G/S, bilge and fire main pump, 30/50M^3/30/20m, 7.5kw

1 - bilge suction pump, 25M^3/20m, 3.7kw

1 - sea water service pump, 12M^3/20m, 2.2kw

1 - fresh water service pump, 3M^3/20m, 1.5kw

Refrigerating plant for chilled water circulating system:

1 - refrigerator driven by 5.5 kw electric motor

1 - sea water chiller and circulating pump driven by 0.75 kw electric motor

1 - condenser and condenser cooling pump driven by 0.75 kw electric motor

1 - automatic control and safety devices

M-4 WORK SHOP

1 - Drilling machine

1 - Elec. grinder

1 - Elec. arc welder

1 - Gas cutter

1 - Overhauling gear set

M-5 AUTOMATIC CONTROL SYSTEM

Air compressor, fuel oil service pump, oily bilge discharge system, fresh water supply system, air conditioning system and provision refrigerating system.

E-1 ELECTRIC POWER AND LIGHTING EQUIPMENT

Main generator, 225 V.AC, 50 Hz, 80 KVA, 2 sets

Battery, 24 V.DC, 200 AH, 2 sets

Main switchboard, 1 set

Lighting system, 220 V. AC

Emergency lighting system, 24 V. DC.

Searchlight, 2 KW, handled inside wheel house

Projectors, 500 W., 10 sets

Daylight signal, 24 V. DC, 60 W. portable type

E-2 ELECTRONICS EQUIPMENT

Radar	64 miles x 10 KW	1
Radio direction finder		1
SSB radio telephone	150 W.	1
VHF radio telephone	25 W.	1
Public addressor	30 Watts with cassette tape recorder, radio receiver and talk back system	1
SOS radio buoy	2182 Khz x 5 Watts	1
Transceiver	2 Watts, portable	4

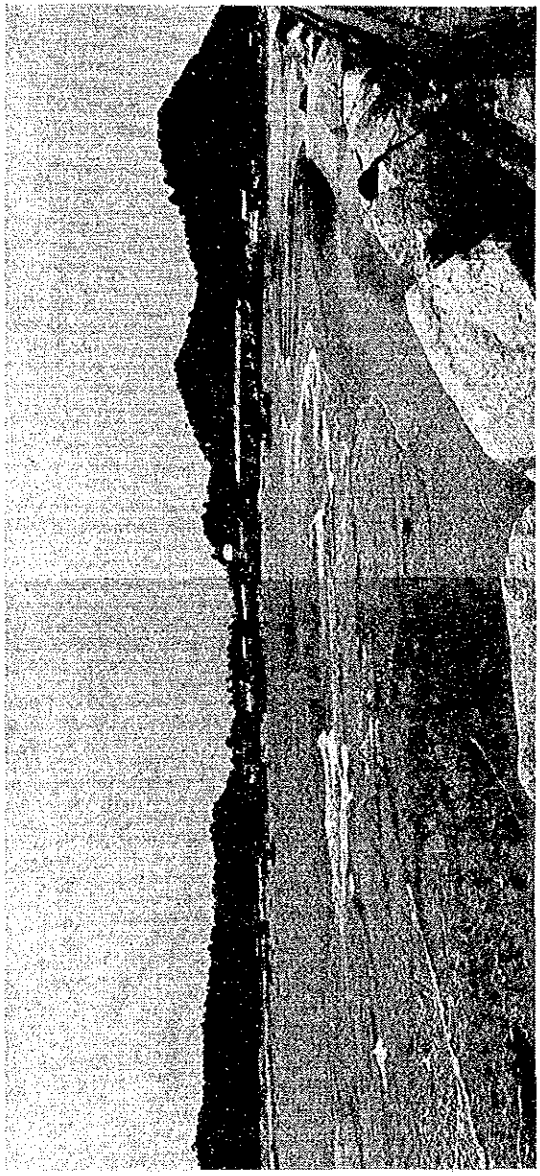
E-3 NAUTICAL EQUIPMENT

Gyro compass with 3 repeaters	1
Magnetic compass, 165 mm. card dia.	1
Sea water thermometer	1
Engine telegraph	1
Clear view screen, 300 mm dia.	1
Anemometer	1
Air horn	1
Rudder angle indicator	1
Doppler log	1

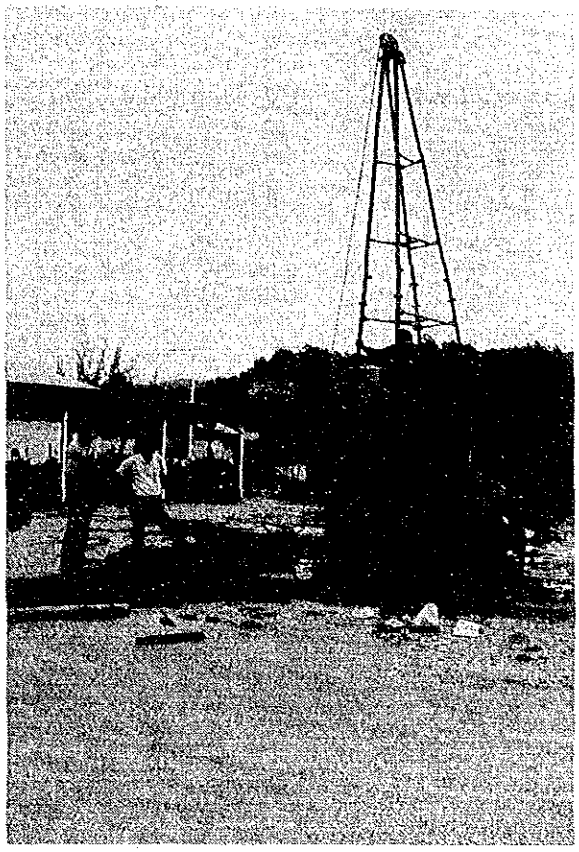
Interior communication system, battery telephone type W/H - - Steer. gear room Engine room	1
Fish finder, 28 Khz / 200 Khz, color display	1
Global positioning system	1
Weather facsimile receiver with 10" recording paper	1
Color scanning sonar, 360°	1

VI Photograph

Construction Site

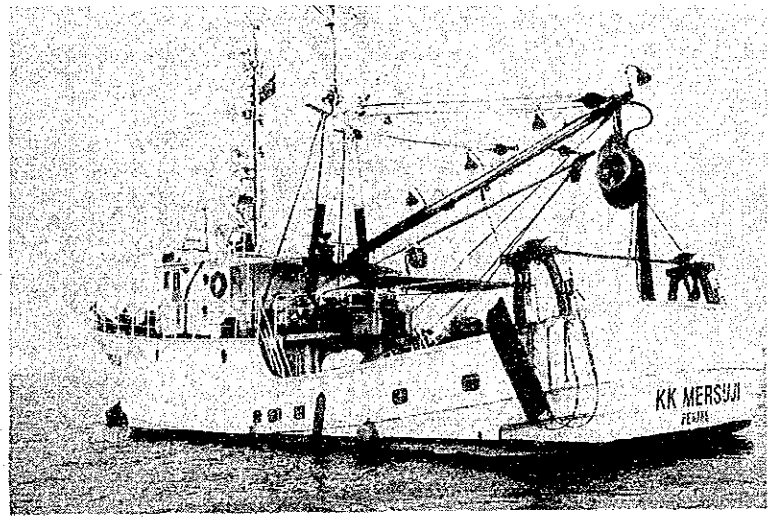


Fishing Port of Chendering

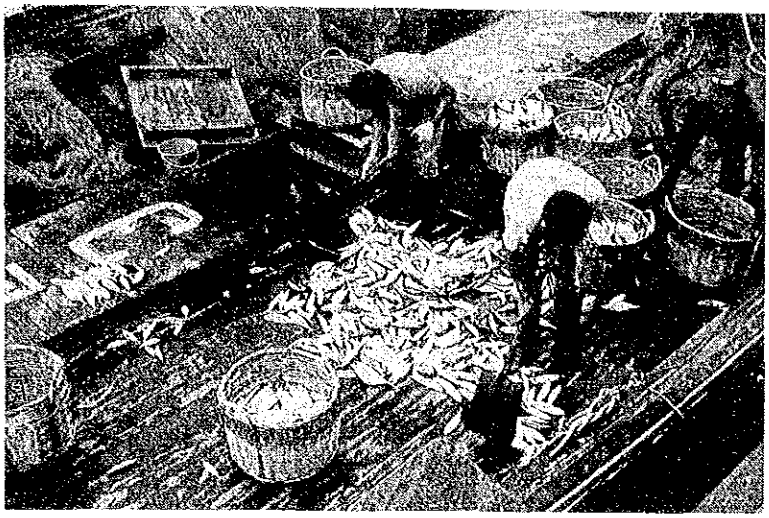


Boring Survey

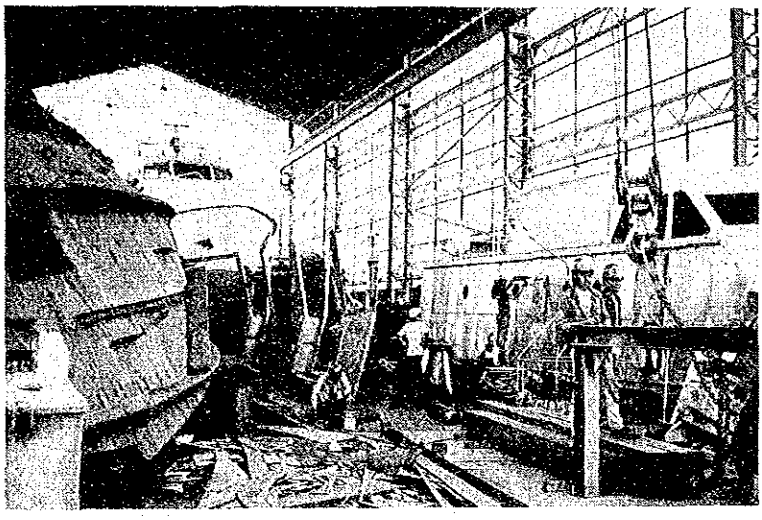
Core Samples of Soil



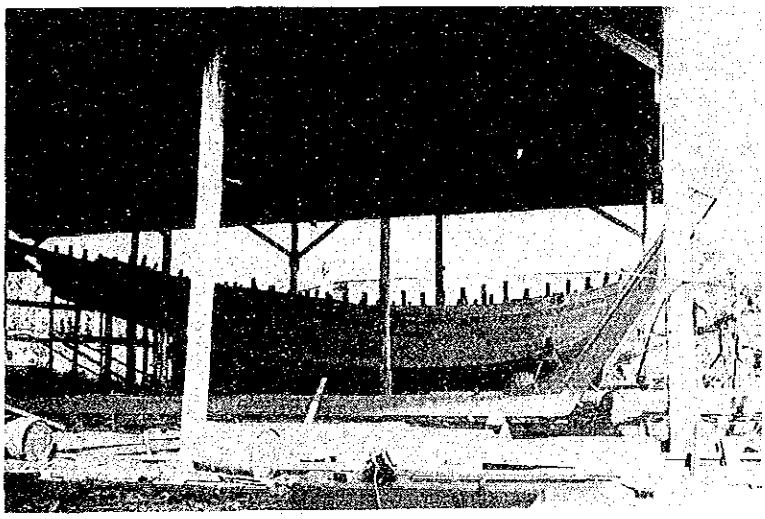
Research/Training Vessel
K.K. MERSUJI



Fish Landing by a Purse-seiner at Chendering



Fishery Patrol Boats under Construction



Wooden Trawler under Construction