

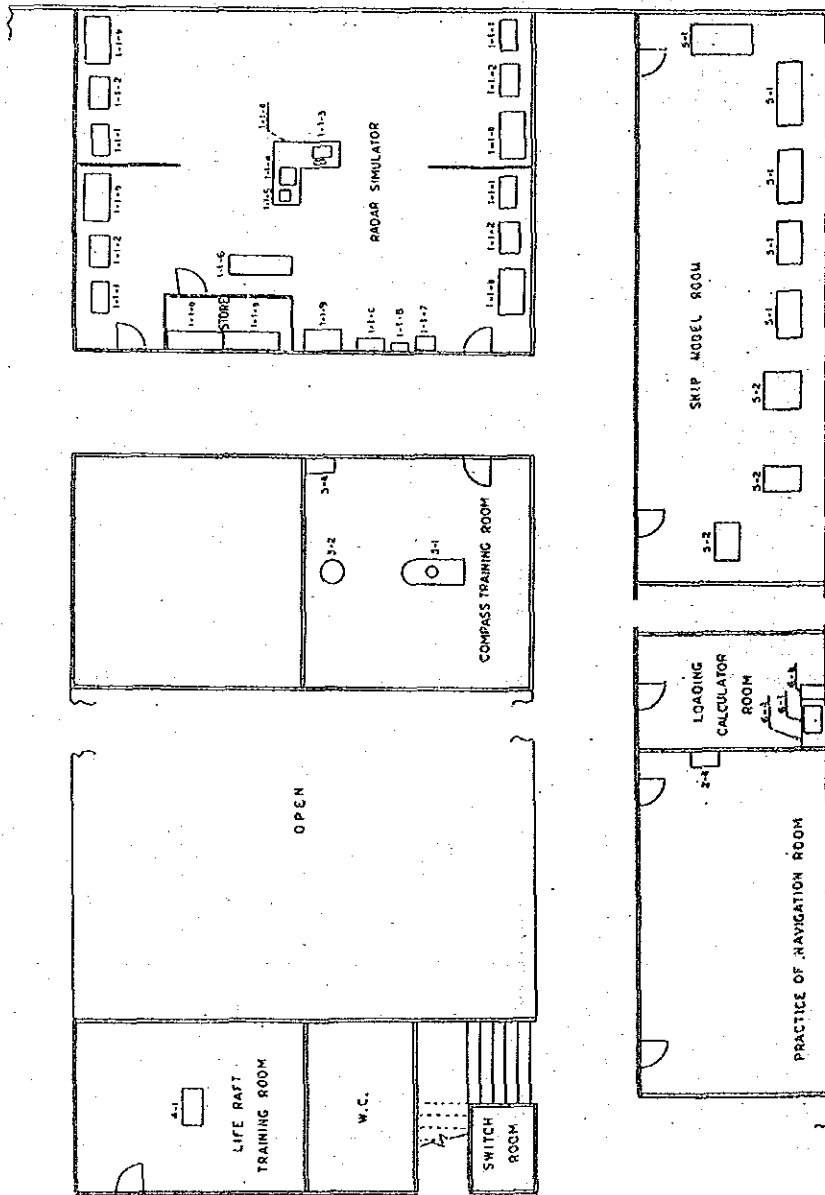
#### 4.4 Arrangement Plan of Equipment

The equipment mentioned above are arranged in the rooms shown in Fig. 4.4.1 through Fig. 4.4.6. The arrangement of the buildings are shown in Fig. 4.4.7 through Fig. 4.4.9.

LIST OF EQUIPMENT

NOTE: FURNITURES MARKED \* SHALL BE PREPARED BY PHA.

- 1 Radar simulator
  - 1-1 Radar simulator
  - 1-1-1 Control console
  - 1-1-2 ARPA
  - 1-1-3 Instructor's console
  - 1-1-4 X-Y plotter
  - 1-1-5 Printer
  - 1-1-6 Control Panel
  - 1-1-7 AVR
  - 1-1-8 Distribution panel
  - 1-1-9 Packaged air conditioner
  - 1-1-a Table \*
  - 1-1-b Chart table
  - 1-1-c Steel cabinet \*
  - 1-1-d Steel shelf \*
- 2 Celestial navigational training set
  - 2-a Steel cabinet \*
  - 2-1 Three globes set
  - 2-2 Transparent celestial globe model
- 3 Compass
  - 3-1 Magnetic compass training set
  - 3-2 Gyro compass training set
  - 3-a Steel cabinet \*
  - 3-3 Gyro scope
- 4 Life raft
  - 4-1 Life raft
- 5 Model of typical ship
  - 5-1 SHIP models
    - (Oil tanker, Container ship, Bulk carrier, General cargo ship, Roll-on/Roll-off ship)
  - 5-2 Hull structure model (Bow, Mid, Stern)
- 6 Loading calculator
  - 6-1 Loading calculator
  - 6-a Table \*
  - 6-b Side table \*



ADMINISTRATION AND INSTRUCTION BLOCK (2ND FLOOR PLAN)

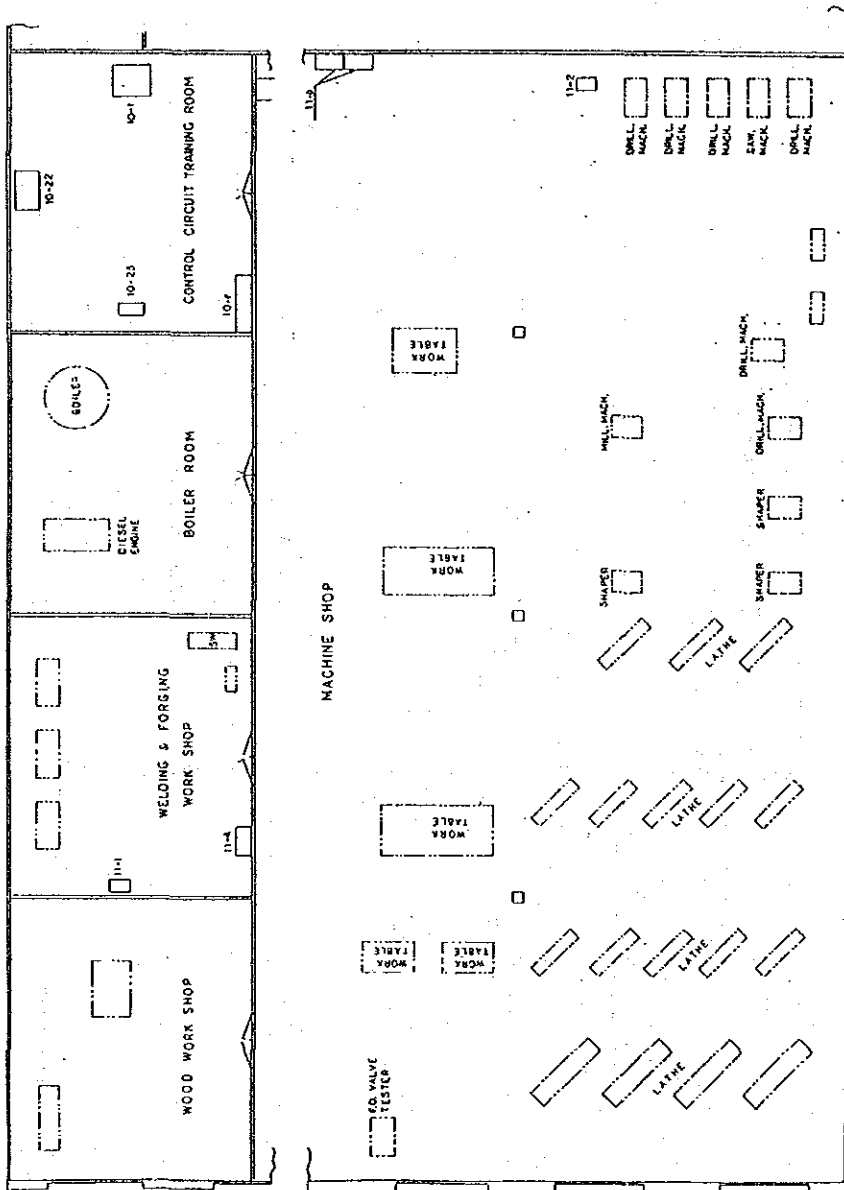
Fig. 4.4.1



LIST OF EQUIPMENT

NOTE: FURNITURES MARKED \* SHALL BE PREPARED BY PMA.

- 10 Testing and measuring equipment
- 10-1 Pneumatic and electric process control device
- 10-22 Oil hydraulic circuit trainer
- 10-23 Pneumatic circuit trainer
- 10-e Steel cabinet \*
- 11 Workshop machine
- 11-1 Arc welding machine
- 11-2 Lapping machine
- 11-a Steel locker \*
- 11-b Steel locker \*



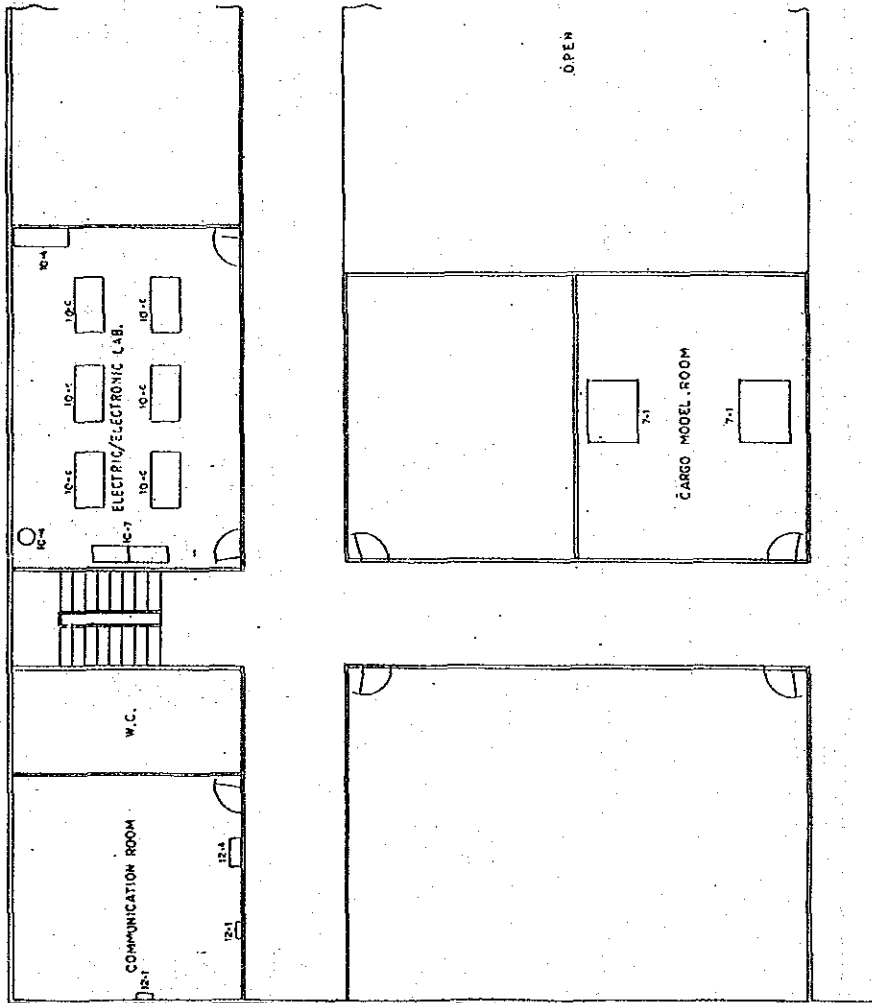
ENGINEERING WORKSHOP LABORATORIES (GROUND FLOOR PLAN)

Fig. 4.4.3

LIST OF EQUIPMENT

NOTE: FURNITURES MARKED \* SHALL BE PREPARED BY PMA.

- 7 Model of cargo gear
- 7-1 Movable cargo gear  
(Ordinary type, Heavy derrick boom type)
- 10 Testing and measuring equipment
  - 10-4 Induction regulator
  - 10-7 Transister and I.C. circuit trainer for instructor
  - 10-a Steel cabinet \*
  - 10-5 Transister circuit trainer for cadets
  - 10-6 Integrated circuit trainer for cadets
  - 10-8 Microcomputer experiment device
  - 10-24 Electric circuit tester
  - 10-25 Logic analyzer
  - 10-b Steel shelf \*
  - 10-c Working table \*
- 12 VHF radio telephone
  - 12-1 VHF radio telephone
  - 12-a Steel cabinet \*



ADMINISTRATION AND INSTRUCTIONAL BLOCK (2ND FLOOR PLAN)

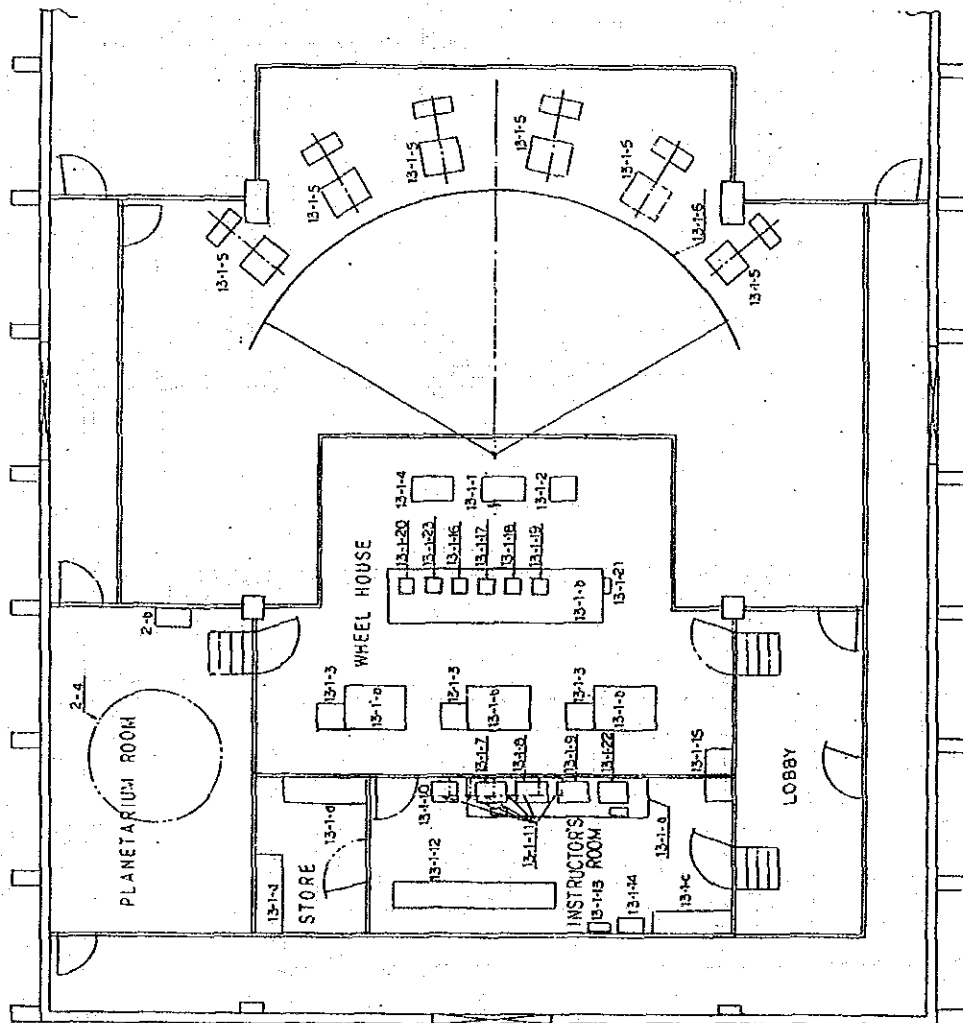
Fig. 4.4.4

LIST OF EQUIPMENT

NOTE: FURNITURES MARKED \* SHALL BE PREPARED BY PMA.

SHIP MANEUVERING SIMULATOR

- 2-3 Mini planetarium
- 2-b Steel cabinet \*
- 13 Ship maneuvering simulator
  - 13-1 Ship maneuvering simulator
    - 13-1-1 Control console
    - 13-1-2 Radar display
    - 13-1-3 Slave radar display
    - 13-1-4 ARPA with 16" display
    - 13-1-5 Video projector
    - 13-1-6 Screen
    - 13-1-7 Instructor's console
    - 13-1-8 X-Y plotter
    - 13-1-9 Printer
    - 13-1-10 Monitor radar display
    - 13-1-11 Video monitor
    - 13-1-12 Control panel
    - 13-1-13 Distribution panel
    - 13-1-14 AVR
    - 13-1-15 Packaged air conditioner
    - 13-1-16 Omega navigator
    - 13-1-17 Decca navigator
    - 13-1-18 Satellite navigator
    - 13-1-19 Loran C navigator
    - 13-1-20 Doppler sonar
    - 13-1-21 Echo sounder
    - 13-1-22 Instructor's console
  - 13-1-23 Direction finder
  - 13-1-a Table \*
  - 13-1-b Chart table
  - 13-1-c Steel cabinet \*
  - 13-1-d Steel shelf \*

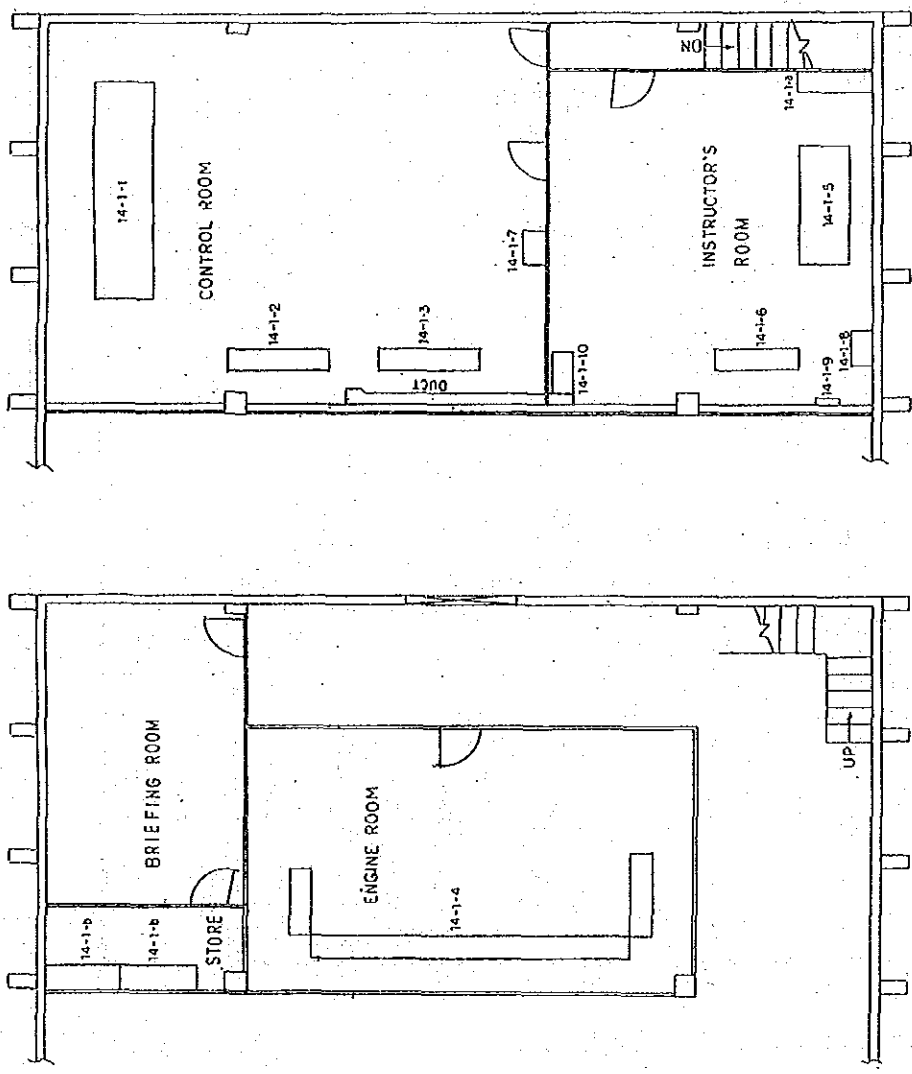


DEMONSTRATION HALL (GROUND FLOOR PLAN)

Fig. 4.4.5

ENGINE PLANT SIMULATOR

- LIST OF EQUIPMENT
- NOTE: FURNITURES MARKED \* SHALL BE PREPARED BY PMA.
- 14 Engine plant simulator
    - 14-1 Engine plant simulator
      - 14-1-1 Control console
      - 14-1-2 Main switchboard
      - 14-1-3 Group starter panel
      - 14-1-4 Graphic panel
      - 14-1-5 Instructor's console
      - 14-1-6 Computer system
      - 14-1-7 Reefer container monitor system
      - 14-1-8 AVR
      - 14-1-9 Distribution panel
      - 14-1-10 Packaged air conditioner
    - 14-1-a Steel cabinet \*
    - 14-1-b Steel shelf \*



1ST FLOOR PLAN

GROUND FLOOR PLAN

DEMONSTRATION HALL

Fig. 4.4.6





DEMONSTRATION HALL

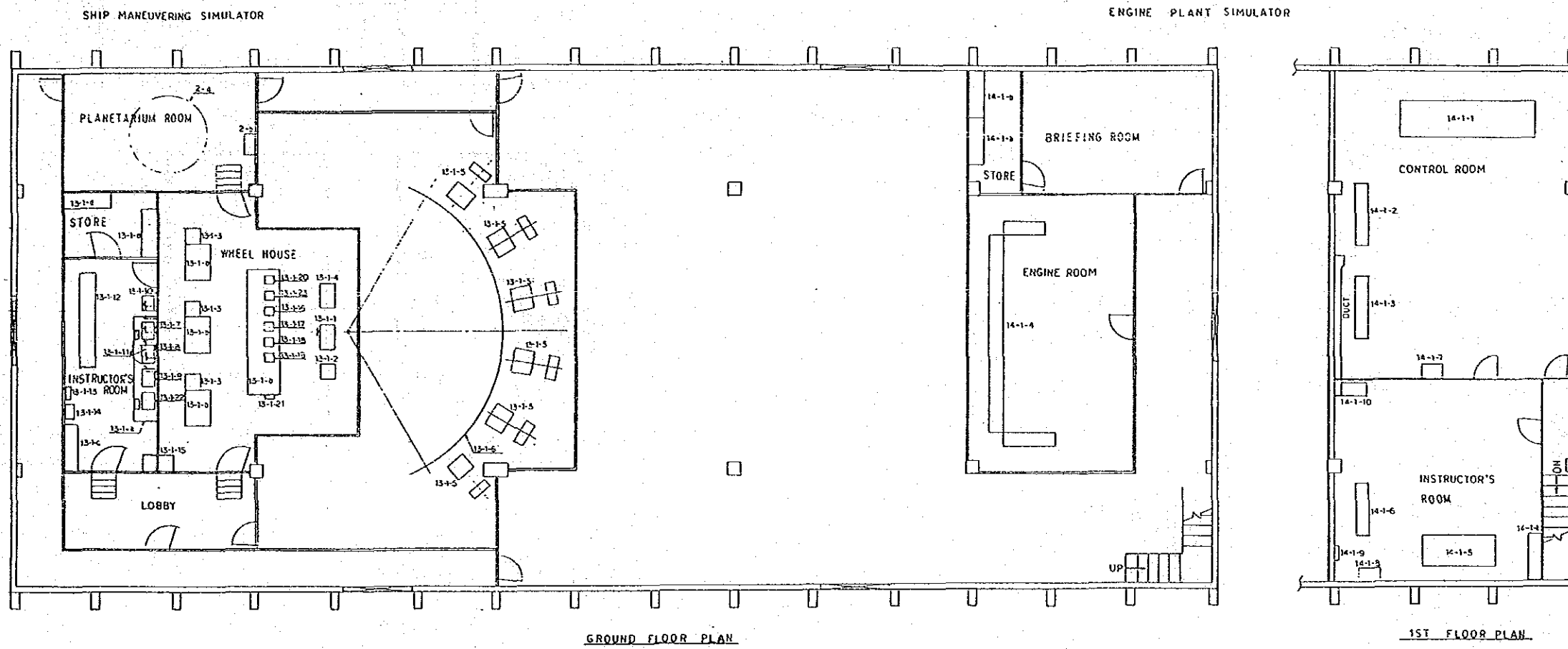


Fig. 4.4.7

ADMINISTRATION AND INSTRUCTIONAL BLOCK (2ND FLOOR PLAN)

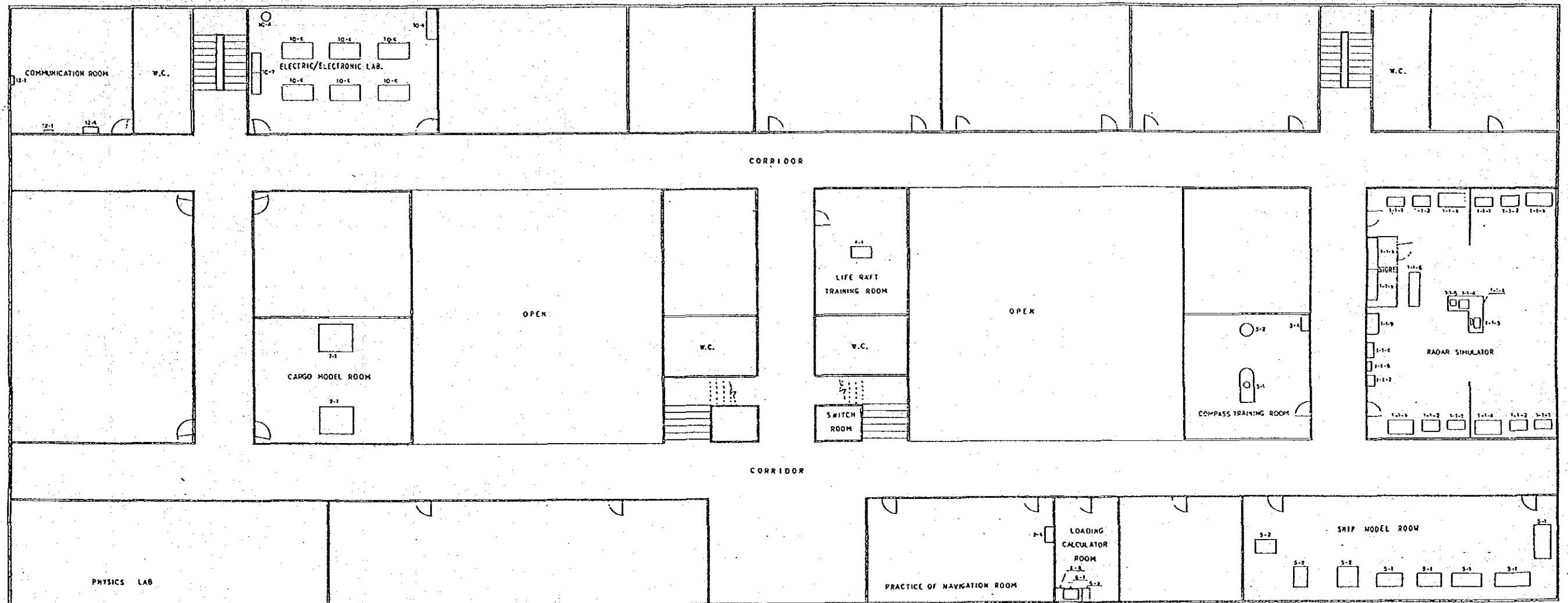


Fig. 4.4.8

ENGINEERING WORKSHOP LABORATORIES (GROUND FLOOR PLAN)

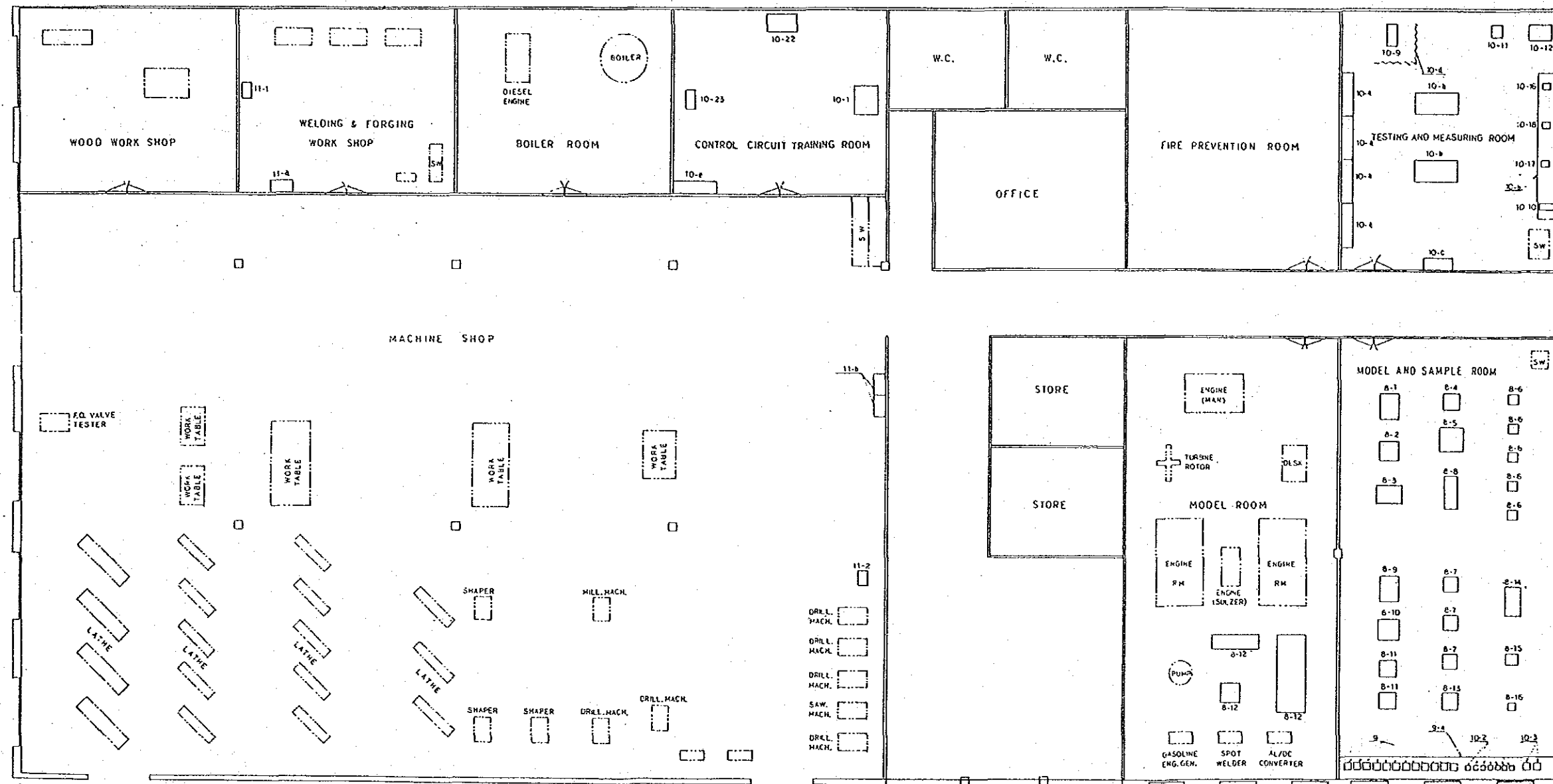


Fig. 4.4.9



## 4.5 Project Implementation Program

### 4.5.1 Implementation plan

After an exchange of notes on the decision to implement the project, contact for consulting service of this project will be concluded between PMA and a Japanese consultant firm and then, consultations will be held between PMA and Japanese consultant about details of the design, a tender invitation, contracts, equipment procurement procedures and field installation work in keeping with the Basic Design.

A viable work plan should be devised through discussions between PMA and the Japanese personnel concerned. The plan should be devised so that no personnel should remain idle due to delays or snags in the flow of implementation. In particular, relevant experts should arrive on site in time for the installation, adjustment and testing of the equipment. All material and human resources should be optimally organized in order to complete the project on schedule.

### 4.5.2 Scope of works

Scope of works done by Japanese side is, as shown in 4.3, supply of equipment, local transport, setting in position, wiring in the rooms, trial run after setting, preparation of tender documents, tendering procedure and the consultancy services for the Project implementation, and Pakistani side is to:

- (i) arrange suitable power supplies and illumination for the equipment at appropriate locations in each assigned room of the buildings.
- (ii) install partitions in accordance with the layout plan.

#### 4.5.3 Supervisory plan

In line with Japan's grant aid program as well as with the Basic Design, the consultant should form a project implementation team. This team should perform design and supervisory tasks consistently to keep the project on schedule.

At supervisory stages, the consultant should approve fabrication drawings, witness completion tests, witness and give instructions at on-site installation, and have experts dispatched for appropriate periods of time when and where they are needed. These tasks, as they are performed, should all contribute to the smooth implementation of the project.

#### 4.5.4 Implementation schedule

Following an exchange of notes on the project between the two countries in line with Japan's grant aid program, the project will be implemented as outlined below.

- implementation design

Tender documents are to be prepared by the consultant under the consulting service contract to be concluded for this project based on the Basic Design and the documents be approved by the agencies concerned.

- tender

The tender period includes the announcement for tender, screening of tenderer qualifications, acceptance and evaluation of submitted estimates, and signing of contracts with successful bidders.

- execution of work

The successful bidders will acquire approval of necessary drawings and conduct witnessed tests on their manufacturing items through the consultant before shipment to Pakistan. The equipment will be delivered in Pakistan on a full turnkey basis.

- Completion of the work

The installed equipment will be operated, tested and inspected for compliance with its specifications by the consultant, PMA officers and others concerned.

Figure 4.5.1 summarizes the implementation schedule.

Number of months after exchange of notes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Exchange of notes																									
Contracting with consultant	○																								
Implementation of detailed design and preparation of tender documents		↔																							
Tender period					○																				
Evaluation of tender results and determination of successful bidders					↔																				
Supply contract					○																				
Period for accepting approval drawings						↔																			
Period for manufacturing machinery and equipment (including witnessed tests on manufacturing processes)								↔																	
Period for transportation																		↔							
Period for on-site installation																					↔				
Period for on-site adjustment																						↔			
Takeover witness test																							↔		
Startup training																								↔	

Fig. 4.5.1 Implementation Schedule



## 4.6 Maintenance Program

### 4.6.1 Maintenance and operation

The effect of the project implementation is not achieved by a mere supply of equipment but requires recipient organ's endeavoring efforts to their proper handling and maintenance.

In this sense, proper preparation and efforts for the operation and maintenance of the equipment are required. PMA has a new manning plan to increase the number of instructors up to 34 persons together with 13 persons of assistant. Though it can be judged that they can afford to operate and maintain the equipment in terms of manpower, the instructors should be well trained in the field of operation and maintenance under the proper training program.

It is suggested that the following items should be carried out so as to maintain the equipment in good condition for a long time:

#### (1) Preparation of instructional manuals

Instructional manuals for operation and maintenance of the equipment should be prepared by the equipment maker with the consultant's approval and it should bring the easy understanding to the instructors of PMA.

#### (2) PMA has to appoint official(s) responsible to take charge of equipment maintenance and operation; the following are considered necessary for them:

- (a) Check lists should be prepared in accordance with the maintenance manual and periodical checking against failure or trouble with their rectifications are recorded in a similar manner in the Deck and Engine "Log Book".
- (b) Referring to the above, the appropriate number of spare parts and consumables should be fixed and stowed in the appropriate store under the proper store control.

As to vital spare parts, supplementary procedures must be taken immediately after their consumption.

(3) Budgeting for maintenance

The budget to provide for the maintenance of the equipment as well as for the replenishment of its spare parts should be appropriated. Refer to 4.6.2 for details.

(4) Timing of training for the instructors in charge

As to the training period of maintenance personnel, their training period for this purpose (as discussed in 3.3.4) is preferably arranged during equipment's manufacturing stage, inclusive of final trial test. Also, such personnel's witness to the local setting and adjustment of the equipment at PMA is highly recommended. Since the local setting and adjustment phase is most suited for training maintenance personnel's assistants, these assistants should be selected in advance of this phase.

4.6.2 Expenditure for maintenance of training equipment

Maintenance and operational costs are estimated roughly under the following conditions.

(1) Equipment parts and consumables are purchased in Japan.

(2) Operation hours are assumed to be around 35 h/year (This assumption is based on max time consuming coastal navigation practice. Refer to Appendix-6).

(3) Total power consumption of equipment is assumed to be around 70 kVA; calculation is shown in Appendix-8.

(4) Assumed Japanese service engineer's cost for Simulator is included.

1) Electric power expense

$70 \text{ kVA/Hr} \times 350 \text{ Hr/year} = 24,500 \text{ kVA} = 19,600 \text{ kW/year}$

$19,600 \text{ kW/year} \times 1.5 \text{ Rupees/kW} = 29,400 \text{ Rupees/year}$

2) Equipment parts

Radar simulator	18,311 Rupees
Ship maneuvering simulator	50,865 Rupees
Engine plant simulator	50,865 Rupees
Electric·electronic circuit	20,346 Rupees
Engine part testing & measurement	30,519 Rupees
Others	55,443 Rupees
Subtotal	226,348 Rupees

Above parts are: Print circuit bases (P.C.B.), hard disc unit, micro-processor, meters, diodes, relays, etc. Cost estimation of equipment parts is drawn from the actual data of existing training equipment in Japan.

3) Consumables

Radar simulator	11,190 Rupees
Ship maneuvering simulator	30,519 Rupees
Engine plant simulator	30,519 Rupees
Engine part tester & measurement	30,519 Rupees
Electric part	10,173 Rupees
Others*	4,069 Rupees
Subtotal	116,989 Rupees

\*These are: Ink ribbon for printers and pens and paper for plotters.

Detailed description of consumables is shown in Appendix-9.

4) Japanese service engineer's periodical inspection		
Operation check for radar & ship maneuvering simulators		
1 engineer x 10 days x 9,664 Rupees = 96,640 Rupees		
Operation check for engine plant simulator		
1 engineer x 10 days x 9,664 Rupees = 96,640 Rupees		
Air Fare	Round ticket	= 99,786 Rupees
Subtotal		293,066 Rupees
Total		665,803 Rupees

The above total exceeds PMA's annual maintenance budget of 400,000 Rupees (1986/87), but with the financial support of the Ports and Shipping Wing of the Ministry of Communications, the amount is considered attainable.

After Japanese service engineers finish their equipment checkup assignment at PMA, the academy's personnel will take charge of the equipment utilizing the experience and knowledge obtained during their actual work with equipment handling etc. up to that time.

Necessary period for periodical inspection service by Japanese engineers will depend upon the attained level of technical ability of PMA's personnel in charge of the equipments.

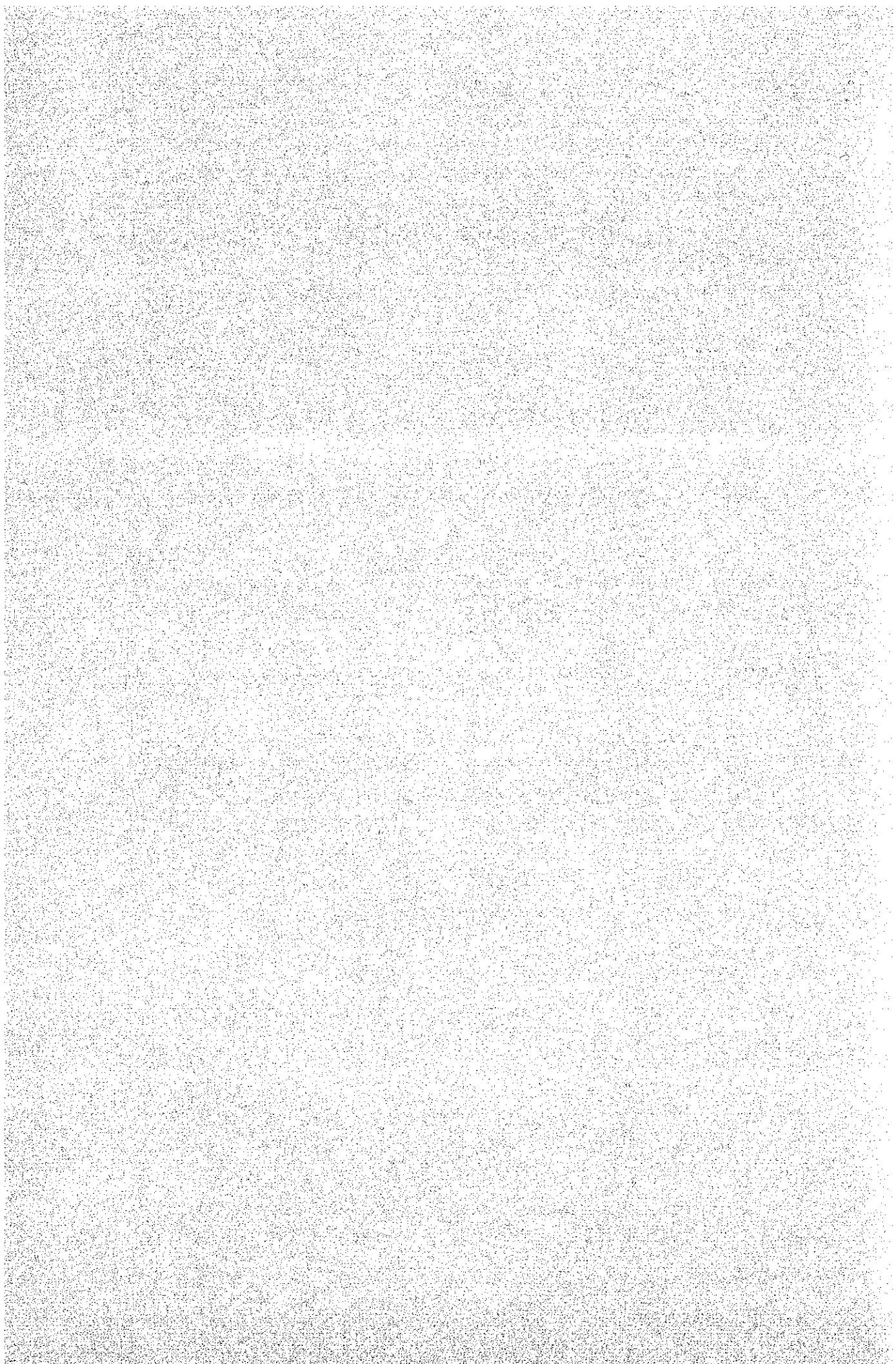
#### 4.6.3 Project cost

Project Cost to be borne by Pakistani side is estimated as Rupees.

The contents being:

- 1) Desk & Work bench            2,375 Rupees
- 2) Cabinet & Shelves            8,250 Rupees

## CHAPTER 5 EVALUATION OF THE PROJECT



## CHAPTER 5 EVALUATION OF THE PROJECT

Due to insufficient educational equipment, PMA is obliged to carry out its education mainly through classroom lectures which means that the total efficiency of seamen training at present is still considered to be at an unsatisfactory level.

This project is intended to raise the result of training at PMA to a level which will satisfy the national expectation of this sector.

Following are the social benefits derived through the execution of the project.

### 5.1 Improvement of Technical Level of Seamen

On board a ship every work for the handling of the ship is to be judged, decided and carried out by the seamen themselves. In order to make this possible, they should be fully trained for this purpose in advance.

Through the implementation of this project, the curriculum is modified from the present lecture centered system into a mixture of well-balanced lecture and practice training system. This will help ensure the higher technical capability of seamen and contributes to greater security in the safety of life and property at sea.

### 5.2 Expansion of the Scope of Seamen Training

To secure greater safety of life and property at sea is the main target for seamen training.

This project will enable PMA to contribute to satisfying such demand and also make the highest class seamen education (equivalent to British Class I) possible at PMA. Furthermore, urgently needed international qualification as stipulated by STCW convention can be effectively attained.

Increase of such qualified seamen is also expected.

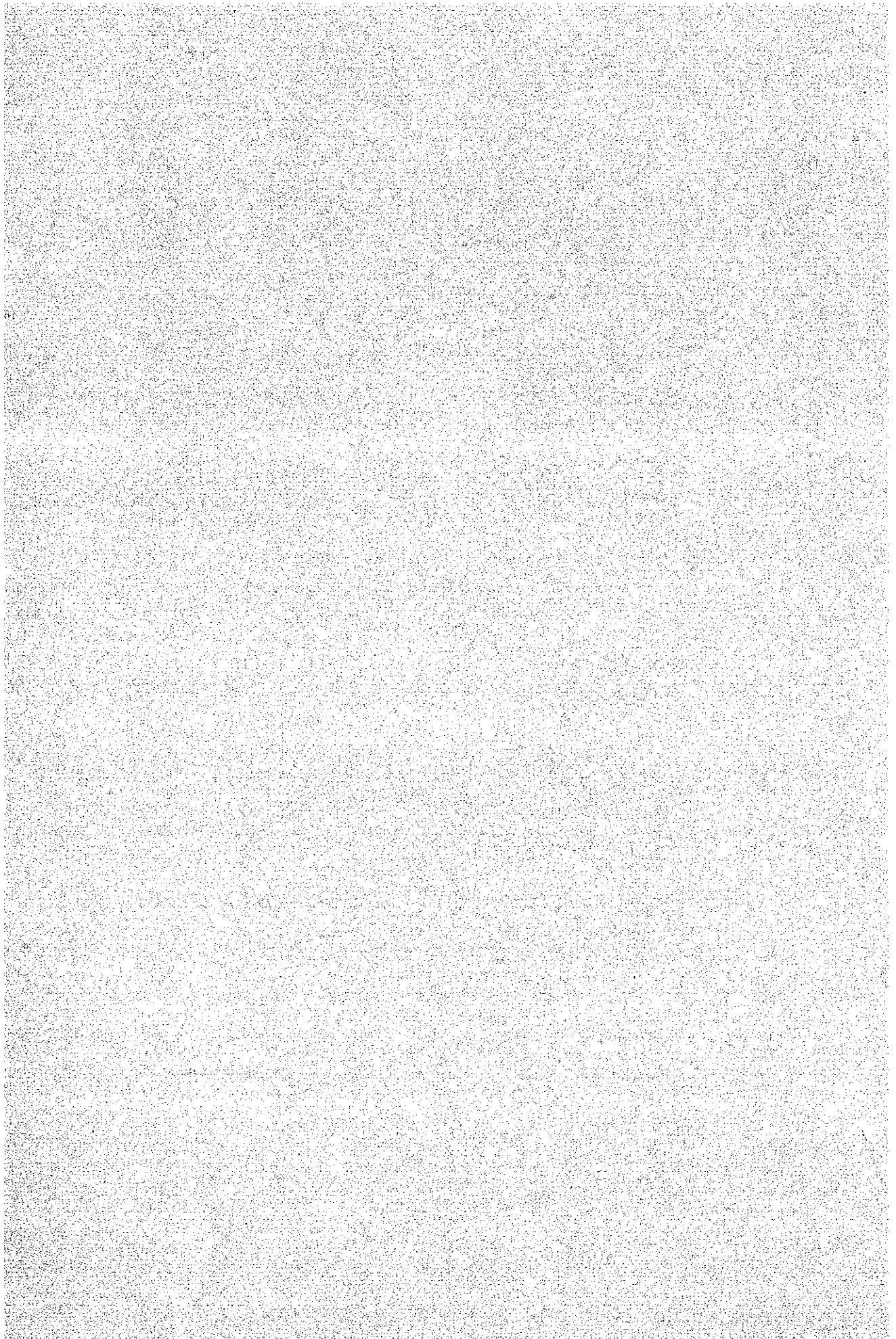
### 5.3 Development of Shipping in Pakistan

Developing a supply of well-qualified seamen to increase Pakistani merchant fleets at their request can easily be achieved and this will contribute to the development of the shipping business.

Considering the above, the validity of this project is fully justified.



## CHAPTER 6 CONCLUSIONS AND RECOMMENDATIONS



## CHAPTER 6 CONCLUSIONS AND RECOMMENDATIONS

### 6.1 Conclusions

As stated earlier, the Government of Pakistan is now encouraging the participation of private shipping business in the presently fully government occupied maritime sector and the commercial fleet is planned to be expanded, therefore, an increased number of qualified seamen will be needed more than ever.

Unfortunately, the present situation of educational equipment at PMA is not adequate to attain seamen education sufficient to cope efficiency with such an urgent need.

Under such circumstances, the implementation of this marine academy upgrading project will enable PMA to train pre-sea cadets of deck part and engine part, to retrain qualified deck officers and engineers as well as to retrain the crew for certification required by the international conventions including the International Convention on STCW, and as a result to supply highly qualified seamen.

Therefore, Japan's grant aid cooperation for this upgrading project is well worth being implemented.

### 6.2 Recommendations

This project is considered to have a great impact on the shipping sector in Pakistan with many expectations, but in order to get maximum social benefit as a result of its implementation, the following efforts by the Pakistani own side are considered indispensable:

- (1) Necessary arrangement for the equipment to be made by the Pakistani side

Furniture such as desks, tables, shelves and lockers necessary for each room should be promptly arranged by the Pakistani Government for the installation of equipment under the appropriate budgetary plan and work schedule plan complying with the progress of installation work schedule.

- (2) Budget for maintenance and management

For the purpose of this project, further efforts should be made to continue the healthy operation with successively secured budget covering the maintenance and management cost.

- (3) Manning plan

The academy's manning plan should be properly implemented under the careful study of the equipment delivery schedule for the effective operation and maintenance of the equipment to be provided in this project.

- (4) Technical cooperation

As mentioned in 3.3.5, PMA officials' training in the equipment maker's shop or the Nautical Training Institute in Japan and Japanese experts' local training in Pakistan after the delivery of equipment is necessary. The following cooperation requested by Pakistan is desirable.

- |  |   |
|--|---|
| 1) Equipment maintenance                                   | Around 3 months, 2 persons<br>(1 in Navigation, 1 in engineering) |
| 2) Equipment operation                                     | Around 3 months, 2 persons<br>(1 in Navigation, 1 in engineering) |
| 3) Local Training by Japanese                              | Around 12 months 2 persons<br>(1 in navigation, 1 in engineering) |
| 4) Local guidance by Japanese<br>Experts in the Curriculum | Around 6 months 2 persons<br>(1 in navigation, 1 in engineering)  |

It is highly recommended that Pakistan take prompt procedures for the above Japanese Technical Cooperation.

(5) Improvement of curriculum

Actually, within the framework of the present circumstances, PMA is conducting necessary education with the available number of personnel and teaching materials.

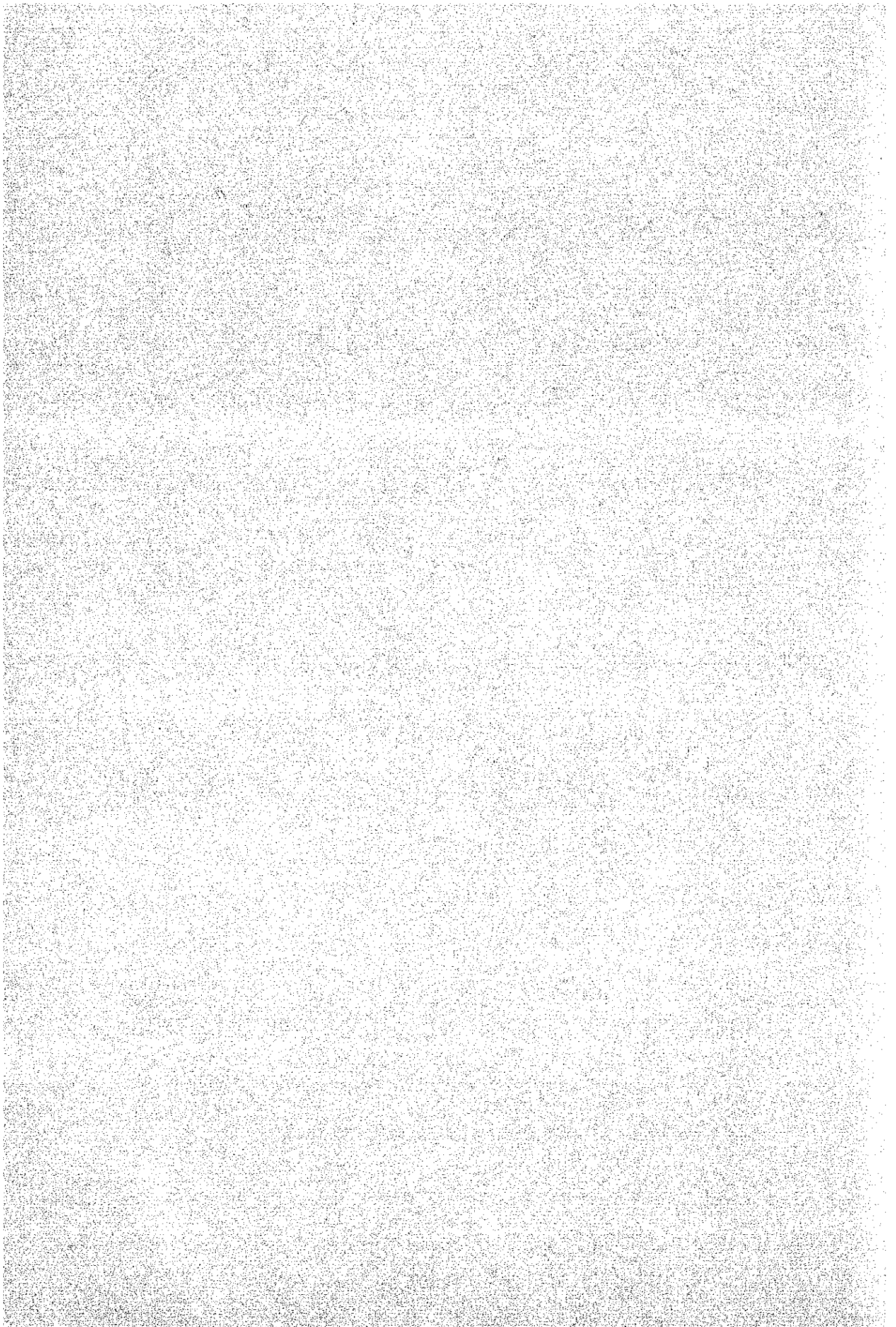
It is difficult and impractical to try to drastically change the long-accepted training curriculum at this academy which is based on long years of historical tradition.

It is much practical that, in order to utilize the new equipment as much as possible as well as to gain the most effective training contents the curriculum should be modified step-by-step as the instructors master the instruction of new training equipment.

It is advisable to commence such modification in the present curriculum after careful preparation for the sake of getting maximum benefit through the utilization of the educational training equipment to be supplied by Japan's Grant Aid Program.



## APPENDIX





## APPENDIX

1. (1) Minutes of Discussions on December 9, 1986  
(2) Minutes of Discussions on February 24, 1987
2. Member List
3. Schedule
4. Personnel with Whom the Study Team Met
5. Technical Co-operation Assistance Requested by Pakaistan Side
6. Proposed Plan for Pre-sea and Post-sea Training
7. Proposed PMA Manpower Development Plan
8. Rough Estimation of Electricity Consumption
9. Consumables for Training Equipment



Appendix-1-(1) Minutes of Discussions on December 9, 1986

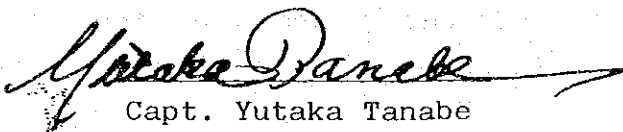
MINUTES OF DISCUSSIONS  
ON  
THE UPGRADING PROJECT FOR PAKISTAN MARINE ACADEMY  
IN  
THE ISLAMIC REPUBLIC OF PAKISTAN

In response to the request of the Government of the Islamic Republic of Pakistan, the Government of Japan decided to conduct a basic design study on the Upgrading Project for Pakistan Marine Academy and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to Pakistan the study team headed by Capt. Yutaka Tanabe, Chairman of Department of Navigation Institute for Sea Training, Ministry of Transport from December 2nd to 22nd, 1986.

The team had a series of discussions on the Project with the officials concerned of the Government of the Islamic Republic of Pakistan and conducted a field survey in Karachi Area.

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

Karachi, December 9, 1986.



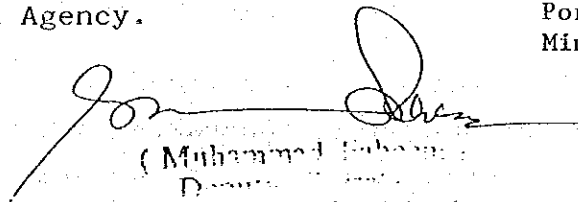
Capt. Yutaka Tanabe  
Leader  
Basic Design Study Team  
Japan International  
Cooperation Agency.



( SAJJAD AKBAR )

HI(M) S.Bt.

Additional Secretary/Director General,  
Ports and Shipping Wing,  
Ministry of Communications  
KARACHI



( Muhammad Ishaq )  
Director  
Economic Affairs Division  
Islamabad

ATTACHMENT

1. Objective of the Project

The objective of the project is to upgrade the training equipment of the Pakistan Marine Academy and to conduct effectively Pre-sea and Post-sea training to enhance Nautical and Engineering technology as well as to meet the STCW Convention requirements.

2. Project Site

The Pakistan Marine Academy has constructed the buildings for installation of the equipment requested with the power distribution lines, water main, and other necessary facilities, the proposed buildings for installing the equipment are shown in Annex 2.

3. Executing Agency

The Pakistan Marine Academy under the Ministry of Communications will be the executing agency for the Project and responsible for its operation and maintenance after completion of the Project.

The Pakistan side ensured that the necessary budget for effective operation and maintenance of the Project will be provided in line with the adequate number of the Pakistan personnel with sufficient knowledge and experiences.

4. Equipment requested by Pakistan side

The Pakistan side emphasized their desire for Japan's Grant Aid for upgrading the Pakistan Marine Academy, and presented the equipment list with priority as shown in Annex 1.

The Japanese Study Team will convey to the Government of Japan the desire of the Government of Pakistan that the former will take the necessary measure to co-operate in implementing the Project and provide necessary equipment under Japan's Grant Aid programme.

5. Grant Aid Programme.

- 1) The Pakistan side has understood Japan's Grant Aid System explained by the Team which includes a principle for use of a Japanese consultant firm and Japanese contractors for the implementation of the Project.
- 2) The Government of Pakistan will take necessary measures as follows with respect to the Grant Aid by the Government of Japan to be extended to the Project.
  - a) To construct the appropriate building, if necessary, with facilities for distribution of electricity, water supply, drainage and other incidental facilities before commencement of installation work.
  - b) To ensure prompt unloadings, tax exemption, customs clearance at ports of distribution of disembarkation in Pakistan and prompt internal transportation therein of the equipment provided under the Grant Aid.
  - c) To exempt Japanese national involved in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in Pakistan with respect to the supply of the equipment and services under the verified contracts.



The Pakistan side mentioned that this exemption<sup>from internal taxes</sup> is subject to the approval of higher authorities according to the rules and regulations of the Government of Pakistan.



- d) To accord Japanese Nationals whose services may be required in connected with the supply of the equipment and the services under the verified contract such facilities as may be necessary for their entry into the Pakistan and stay therein for the performance of the Project.

#### 6. Technical Cooperation

The Pakistan side requested the need for a dispatch of Japanese experts as well as technical training of counterpart personnel in Japan in the field of maintenance and operation and making training curriculum of the said equipment. The Pakistan side also understood that in case of the official request for the above, A-1 Form for the assignment of Japanese experts and A-2, A-3 Forms for technical training in Japan for the counterpart personnel should be submitted through diplomatic channels.

LIST OF TRAINING EQUIPMENT

<u>Sl No</u>	<u>I t e m</u>	<u>Q t y</u>	<u>Priority</u>
1.	Radar Navigation		
1-1	Bridge-cum-Radar Simulator (4-radar display, 4-own control ship control stand) (including ARPA simulator).	1 set	A
2.	Collision Prevention		
2-1	Ship lights simulator	1 set	B
3.	Practice of Navigation (Celestial observation).		
3-1	Three globes set	2 sets	A
3-2	Celestial globe model	1 set	
3-3	Model to demonstrate relative motion of planets and moon (three globe sets)	1 set	
3-4	Mini planetarium	1 set	
4.	Electronic System of Position Fixing and Echo Sounder		
4-1	Electronic navigation aids simulator.	1 set	A
5.	Electronic Direction Finder		
5-1	Direction Finder	1 set	A
6.	Meteorology		
6-1	Marine aneroid barometer	1 pc	B
6-2	Hygrometer	1 pc	
6-3	Weather facsimile	1 set	
6-4	Observation facility	1 set	

<u>Sl No</u>	<u>I t e m</u>	<u>Q t y</u>	<u>Priority</u>
7.	Compasses - Magnetic & Gyro		
7-1	Magnetic compass training set	1 set	A
7-2	Gyro compass training set	1 set	
7-3	Gyro scope	1 pc	
8.	Life saving		
8-1	Life raft with container	1 set	A
9.	Ship Manoeuvring and Handling		
9-1	Ship manoeuvring simulation system	1 set	A
9-2	Steering gear system training set (incl pilot stand and rudder)	1 set	B
9-3	Engine plant operation simulation system (FPP).	1 set	A
10.	Ship Construction and Stability		
10-1	Model of typical ships (Crude oil carrier, Container carrier, Bulk carrier, General Cargo ship and Ro/Ro ship.	1 set Each	A
10-2	Model of typical hull section	1 set	
10-3	Model of typical bow section	1 set	
10-4	Model of typical stern section	1 set	
10-5	Loading calculator for stability training.	1 set	
10-6	Model of ship stability using stability tank.	1 set	



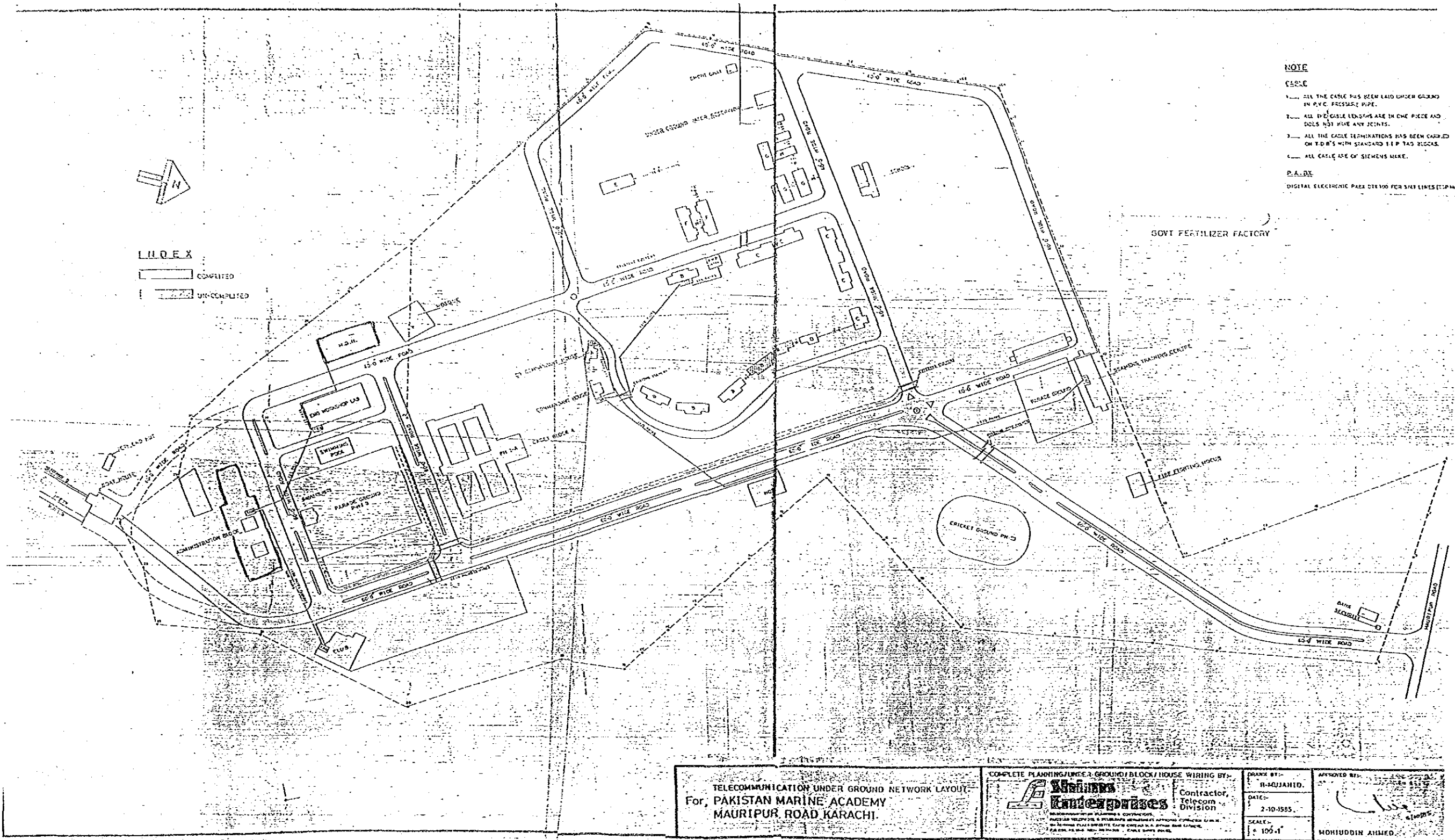
<u>Sl No</u>	<u>I t e m</u>	<u>Q t y</u>	<u>Priority</u>
11.	Cargo Handling and Storage		
11-1	Model of cargo derrick and hatch way with cover.	1 set	A
11-2	Cargo and ballast handling simulator for tanker.	1 set	B
11-3	Cut away model of tank cleaning machine.	1 set	A
11-4	Working model of various type cargo gear (velle derrick, Stulcken derrick, other heavy derricks, crane, etc.)	1 each set	A
12.	Cut away models, working if possible		A
(1)	2-cycle engine	1 set	
(2)	Thrust block	1 set	
(3)	4-cycle engine	1 set	
(4)	Marine steam turbine	1 set	
(5)	Exhaust gas turbo charger	1 set	
(6)	Marine boiler	1 set	
(7)	Various type of pumps including hydraulic oil pump, fuel oil injection pump.	1 set	
(8)	Exhaust gas economizer	1 set	
(9)	Gear (3 type, spur, planetary and bevel type).	1 each set	
(10)	Stern tube assembly with shaft and FPP	1 set	
(11)	CPP	1 set	
(12)	Side thruster	1 set	

<u>Sl No</u>	<u>I t e m</u>	<u>Q t y</u>	<u>Priority</u>
(13)	Steering gear (each one for ram and vane type).	2 sets	
(14)	Deck machinery		
	Mooring winch	1 set	
	Windlass	1 set	
	Capstan	1 set	
(15)	Cooler (plate type)	1 set	
(16)	Provision ref plant with compressor.	1 set	
(17)	Dynamo	1 set	
(18)	Electric motor (AC motor)	1 set	
13.	Various type of valves:		A
(1)	Main engine starting air valve	1 set	
(2)	Main engine fuel injection valve	1 set	
(3)	Main engine cylinder safety valve	1 set	
(4)	Glove valve	1 set	
(5)	Angle valve	1 set	
(6)	Sluice valve	1 set	
(7)	Butterfly valve	1 set	
(8)	Swing check valve	1 set	
(9)	Diaphragm control valve (32 mm dia.)	1 set	
(10)	Pressure control valve (25 mm dia.)	1 set	
(11)	Pilot type temperature control valve (25 mm dia.)	1 set	
(12)	Pressure reducing valve (25 mm dia)	1 set	

<u>Sl No</u>	<u>I t e m</u>	<u>Q t y</u>	<u>Priority</u>
14.	Automatic and Remote Control System		
14-1	Air and electric type process controller training set (Level, temperature, flow)	1 set	A
14-2	Various type of sensors, transducers and positioners or amplifiers.	1 set	A
14-3	Governors (all speed type and constant speed type).	1 each set	A
15.	Electrical & Electronic Equipment & Installations		
15-1	Induction Regulator	2 sets	A
15-2	Transistor circuit trainer	5 sets	A
15-3	Integrated circuit trainer	5 sets	A
15-4	Demonstration board	5 sets	A
15-5	Micro processor training facilities.	5 sets	A
16.	Workshop Machinery		
16-1	Electric welding machine	1 set	A
16-2	Lathe machine	1 set	B
16-3	Lapping machine	1 set	A
17.	Testing and Measuring Equipment (Machinery Part).		
17-1	Impact testing machine	1 set	A
17-2	Hardness testing machine (Vickers)	1 set	A
17-3	Hardness testing machine (Brinell)	1 set	A
17-4	Fuel injection valve tester	2 sets	A
17-5	Surface roughness tester	2 sets	A
17-6	Sound level tester	2 sets	B

<u>Sl No</u>	<u>I t e m</u>	<u>Q t y</u>	<u>Priority</u>
17-7	Flash point tester	2 sets	B
17-8	Boiler water test kit	2 sets	A
17-9	Gas analyzer	1 set	A
17-10	Fuel oil analyzer kit	1 set	A
17-11	Dial gauge with magnet base	2 sets	B
17-12	Viscometer (Redwood)	1 set	A
17-13	Viscometer (Saybolt Universal)	1 set	A
17-14	Viscometer (Englar)	1 set	A
17-15	Planimeter	1 set	A
17-16	Flowmeter	1 set	A
17-17	Vibration meter	1 set	A
17-18	Hydraulic circuit trainer	1 set	A
17-19	Pneumatic circuit trainer	1 set	A
18.	Testing and Measuring Equipment (Electrical Part)		
18-1	Circuit tester	1 pc	A
18-2	Logic analyzer	1 set	A
18-3	Oscilloscope	1 set	B
18-4	Oscilograph	1 set	B
18-5	Storoboscope	1 set	B
19.	Communication Equipment		
19-1	VHF Radio Telephone with antenna.	2 sets	A
20.	Seaman Ship Training Equipment		
20-1	Small sailing boat	1 set	B
20-2	Outboard engine	1 set	B
21.	Spare parts for above machinery & Eqpt		
21-1	Spare parts for one year operation after expiry of warranty period.	1 set	A








MINUTES OF DISCUSSIONS  
ON  
THE PROJECT  
FOR  
UPGRADING PAKISTAN MARINE ACADEMY  
IN  
THE ISLAMIC REPUBLIC OF PAKISTAN

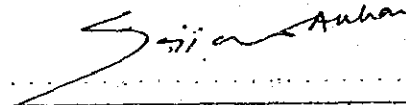
In response to the request of the Government of the Islamic Republic of Pakistan for Grant Assistance for the Project for Upgrading Pakistan Marine Academy (hereinafter referred to as "the Project"), the Government of Japan decided to conduct a basic design study on the Project and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to Pakistan the team headed by Capt. Yutaka Tanabe, Chairman of Department of Navigation, Institute for Sea Training, Ministry of Transport, from December 2nd to 18th, 1986.

As a result of the study, JICA prepared a draft report and dispatched a team to explain and discuss it from February 20th to 27th, 1987.

Both parties had a series of discussions on the Report and 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.

Karachi, February 24, 1987.


  
Capt. Yutaka Tanabe  
Leader  
Basic Design Study Team  
Japan International  
Cooperation Agency

  
Sajjad Akbar, HI (M), S.Bt,  
Additional Secretary/Director  
General, Ports & Shipping Wing  
Ministry of Communications,  
Karachi.



ATTACHMENT

1. The Project title is to be changed as "The Project for Upgrading Pakistan Marine Academy".
2. The Report satisfies the Pakistan side in principle and appropriate alterations will be incorporated in the Final Report.
3. The Pakistan side understood Japan's grant aid system and confirmed that the necessary measures will be taken by the Pakistan side as shown in the Item 5-2 of the Minutes of Discussions on the Project signed on December 9th, 1986, on condition that the grant aid by the Government of Japan would be extended to the Project. Japanese side stated that the Item 5-2(C) of the above-mentioned Minutes of Discussions should be discussed between two governments so as to ensure the smooth implementation of the Project.
4. The Pakistan side ensured that the necessary budget for the effective operation and maintenance of the Project to be implemented under the Grant Aid will be provided along with adequate number of Pakistani personnel with sufficient knowledge and experience.
5. The Final Report (10 copies in English) will be submitted to the Pakistan side by the end of April, 1987.

  
Said

Appendix-2 Member List

Basic design study team (Dec. 2, 1986 - Dec. 18, 1986)

Specialty	Name	Position
Leader	Capt. Yutaka TANABE	Chairman of Department of Navigation, Institute for Sea Training, Ministry of Transport
Training Equipment Planning	Mr. Takashi KIZAWA	Senior officer, Ship Machinery Industry Division, Marine Technology and Safety Bureau, MOT
Technical Cooperation	Mr. Isawo YOSHIKANE	Staff, International Cooperation Division, MOT
Project Coordinator	Mr. Kiyoshi ISAKA	Deputy Head Planning Planning Division, Grant Aid Planning & Survey Department, JICA
Training Program	Mr. Tomotaka HAMA	OSCC
Training Equipment	Mr. Masayasu TAKEBAYASHI	OSCC
Cost Estimation	Mr. Hiroshi AKIYOSHI	OSCC

Draft final report explanation team (Feb. 20, 1987 - Feb. 28, 1987)

Specialty	Name	Position
Leader	Capt. Yutaka TANABE	Chairman of Department of Navigation, Institute for Sea Training, Ministry of Transport
Project Coordinator	Mr. Toshio NAKAMURA	Deputy Head Second Basic Design Study Division, Grant Aid Planning & Survey Department, JICA
Training Program	Mr. Tomotaka HAMA	OSCC
Training Equipment	Mr. Masayasu TAKEBAYASHI	OSCC

Appendix-3 Schedule

Basic design study team (Dec. 2, 1986 - Dec. 18, 1986)

Date	Description
1. December 2nd (Tue.)	Leave Tokyo - Arrive at Karachi
2. 3rd (Wed.)	- Visit to Pakistan Marine Academy (PMA) Explanation of Project, objective, questionnaire, etc. - Member meeting on the suitability of the equipment
3. 4th (Thr.)	- Visit to PMA Discussion of the equipment - Explanation of Japan's Grant Aid Program - Visit to Ports & Shipping Wing, Ministry of Communications Explanation of this time's study work
4. 5th (Fri.)	- Visit to PMA Discussion on the technical cooperation related to the Project - Member meeting on the report preparation
5. 6th (Sat.)	- M.S. "HYDERABAD" (18,000 DWT Multi-Purpose Cargo Ship at Karachi Port) Visit on board to observe the Pakistan fleet's actual maintenance condition

Date	Description
6. December 7th (Sun.)	<ul style="list-style-type: none"> <li>- Visit to Ports &amp; Shipping Wing, Ministry of Communications on the discussion for the preparation of "MINUTES OF DISCUSSIONS"</li> <li>- Leave Karachi for Islamabad</li> <li>- Explanation of this Project to Resident Representative of JICA, Pakistan Office</li> </ul>
7. 8th (Mon.)	<ul style="list-style-type: none"> <li>- Visit to Ministry of Planning for explanation of the equipment</li> <li>- Visit to Economic Affairs Division for the explanaiton of the equipment with discussion of the "MINUTES OF DISCUSSIONS"</li> </ul>
8. 9th (Tue.)	<ul style="list-style-type: none"> <li>- "MINUTES OF DISCUSSIONS" officially agreed upon and signed by Pakistan and Japan's representatives at EAD Office, Islamabad</li> <li>- Visit to Japanese Embassy on the "MINUTES OF DISCUSSIONS" exchange</li> <li>- Leave Islamabad for Karachi</li> </ul>
9. 10th (Wed.)	<ul style="list-style-type: none"> <li>- Team leader and two(2) members leave Karachi for Tokyo</li> </ul>
10. 11th (Thr.)	<ul style="list-style-type: none"> <li>- Visit to PMA (remaining members) Detailed study of site and location intended for equipment installation</li> </ul>
11. 12th (Fri.) (holiday)	<ul style="list-style-type: none"> <li>- Team member meeting on collected data</li> </ul>

Date	Description
12. December 13th (Sat.)	- Visit to PMA Detailed investigation on the equipment exhibition, etc.
13. 14th (Sun.)	- Visit to PMA to get outstanding data. Reference data collection (Map of Pakistan, etc.)
14. 15th (Mon.)	- Team member meeting on collected data
15. 16th (Tue.)	- Team member meeting on collected data
16. 17th (Wed.)	- Team member meeting on collected data
17. 18th (Thr.)	- Leave Karachi for Tokyo

Draft final report explanation team (Feb. 20, 1987 - Feb. 28, 1987)

Date	Description
1. February 20th (Fri.)	- Arrive at Karachi
2. 21st (Sat.)	- Visit to PMA Explanation of Draft report
3. 22nd (Sun.)	- Visit to PMA Explanation of Draft report
4. 23rd (Mon.)	- Visit to Ports & Shipping Wing, Ministry of Communications - Explanation of Draft report
5. 24th (Tue.)	- Visit to Ports and Shipping Wing, Ministry of Communications Signing of Minutes of Discussions - Visit to Japanese Consulate in Karachi Explanation of Draft report, Report on the results - Leave Karachi for Islamabad
6. 25th (Wed.)	- Visit to JICA Pakistan Office Explanation of Draft report, Report on the results - Visit to Japanese Embassy Explanation of Draft report, Report on the results - Visit to Economic Affairs Division Briefing on discussion with Ports & Shipping Wing, Ministry of Communications and PMA

Date	Description
	- Visit to Ministry of Telecommunication Briefing on discussions with Ports & Shipping Wing, Ministry of Communications and PMA
7.	26th (Thr.) - Team member meeting
8.	27th (Fri.) - Team member meeting Leave Islamabad
9.	28th (Sat.) - Arrive at Tokyo





Appendix-4 Personnel with Whom the Study Team Met

Basic design study team (Dec. 2, 1986 - Dec. 18, 1986)

- (1) PMA:
  - Commandant Mr. Shahid AFZAL
  - Deputy Commandant Capt. Mian Khan MALIK
  - Chief Nautical Instructor Capt. Rahmat ALI
  - Chief Engineering Instructor C. Engr. Perver ANWAR
  - Technical Advisor & Consultant C. Engr. Zahid RAHMAN
  - Education Officer Mr. A. MATEEN
  
- (2) Ministry of Communications:
  - Deputy Secretary Mr. Ibrahim SHAH
  - Additional Secretary/  
Director General, Ports  
& Shipping Wing Mr. Sajjad AKBAR
  
- (3) Ministry of Planning:
  - Chief Planning for Tele-  
Communication and  
Communication Mr. Malik Mohammad Safeed KHAN
  
- (4) Economic Affairs Division,  
Ministry of Finance and  
Economic Affairs:
  - Deputy Secretary Mr. Mohammad FAHEEM
  
- (5) Japanese Embassy:
  - Minister Mr. J. Kobayashi
  - First Secretary Mr. S. Obu
  
- (6) Consulate General of Japan in Karachi:
  - Vice Consul Mr. S. Ochiri
  
- (7) JICA, Pakistan Office:
  - Resident Representative Mr. K. Wada

Draft final report explanation team (Feb. 20, 1987 - Feb. 28, 1987)

- (1) PMA:
- |                                |                       |
|--------------------------------|-----------------------|
| Commandant                     | Mr. Shahid AFZAL      |
| Deputy Commandant              | Capt. Mian Khan MALIK |
| Chief Nautical Instructor      | Capt. Rahmat ALI      |
| Chief Engineering Instructor   | C. Engr. Perver ANWAR |
| Technical Adviser & Consultant | C. Engr. Zahid RAHMAN |
- (2) Ministry of Communications:
- |  |                   |
|--|-------------------|
| Secretary  | Mr. K. U. FAROOGI |
| Additional Secretary/<br>Director General Ports<br>& Shipping Wing | Mr. Sajjad AKBAR  |
| Director Projects<br>Ports & Shipping Wing                         | Capt. I. A. KHAN  |
| Nautical Surveyor<br>Ports & Shipping Wing                         | Capt. M. Y. RIZVI |
- (3) Economic Affairs Division  
Ministry of Finance and  
Economic Affairs:  
Joint Secretary
- Mr. Abdul Chafloor MIRZA
- (4) Japanese Embassy:  
First Secretary
- Mr. S. Obu
- (5) Consulate General of Japan  
in Karachi:  
Consul
- Mr. Y. Takeuchi
- (6) JICA, Pakistan Office:  
President Representative
- Mr. K. Wada

TECHNICAL CO-OPERATION ASSISTANCE REQUESTED BY PAKISTAN SIDE

The Technical Co-operation will comprise following parts:

a. Training of Maintainers

For this purpose technical officers and technicians will be trained in Japan for the repair and maintenance of equipment. They are required to be proficient for second level of maintenance. Their duration of training is expected for about one year. Two officers and three technicians are proposed.

b. Training of Operators

For this purpose the operators are required to be completely familiar with the operation of the equipment. It is desired that they should also have some training in Instructional methodology in the use of Simulators. This could be arranged by visits to establishments where such equipment is installed. The number of instructors that are proposed for this purpose are minimum of three and maximum of five. Duration between 4 to 6 months.

c. Experts from Japan

At least two experts from Japan to come to Pakistan to maintain and run the equipment for atleast one year. Their secondary purpose will also be to give on the job training to our Maintainers & Operators.

d. Familiarization Study

For at least 3 to 5 senior officers from the Academy and the Ministry to familiarize them with the equipment being procured. This will also include visits to Mercantile Marine Training Establishments, training ships and suppliers factories. The duration for this is proposed about 3 to 4 weeks, possibly divided in two groups.



Nautical department

Subject	Teaching hours	
	Lecture hours	Laboratory hours
<u>1. NAVIGATION</u>		
Introduction to navigation	45	45
Principles of navigation	110	-
Coastal navigation	-	135
Ocean and offshore navigation	125	-
Radar navigation	30	60
Electronic navigation systems	20	70
	<u>330</u>	<u>310</u>
<u>2. MARINE OPERATINGS:</u>		
Proficiency in survival craft	10	30
Seamanship	150	80
Fire prevention & fire fighting	25	25
Watchkeeping	90	-
Marine communications	10	60
	<u>285</u>	<u>195</u>
<u>3. MARINE TRANSPORTATION:</u>		
Ship stability	30	20
Ship construction	30	10
Cargo handling and stowage	90	20
	<u>150</u>	<u>50</u>
<u>4. METEOROLOGY</u>		
	100	40
<u>5. MEDICAL FIRST AID PROCEDURES</u>		
	9	6
	<u>109</u>	<u>46</u>
	<u>874</u>	<u>601</u>

Proposed Plan for Pre-sea Training (Four Years)

Engineering department

Subject	Teaching hours	
	Lecture hours	Laboratory hours
<u>MATHEMATICS</u>		
Arithmetics	20	-
Algebra	25	-
Trigonometry	30	-
Mensurations	15	-
	<hr/> 90	
<u>THERMODYNAMICS</u>		
Thermodynamic properties	12	-
Thermodynamic energy	8	-
Thermodynamic systems	4	-
Energy change equation	8	-
Heat transfer	15	-
Vapours	10	-
Ideal gases	11	-
Thermodynamic processes	12	-
Work transfer	10	-
	<hr/> 90	
<u>MECHANICAL SCIENCE</u>		
Definition of units	10	-
Statics	22	-
Dynamics	30	-

Subject	Teaching hours	
	Lecture hours	Laboratory hours
Simple machines	13	-
Hydrostatics	20	-
Hydraulics	25	-
	120	
<u>ENGINEERING DRAWING</u>		
Basic knowledge and technique	3	8
Constructional Techniques	2	6
Free hand sketching	2	6
Application	3	30
	10	50
<u>ELECTRO TECHNOLOGY</u>		
Nature of electricity	15	5
The effect of electric current	20	10
Resistance and conductance of materials	15	10
The simple direct current and electrical circuits	25	15
Electro magnetism	15	20
Electrical instruments	10	15
Electronics	20	15
	120	90



Subject	Teaching hours	
	Lecture hours	Laboratory hours
<u>HAND AND POWER TOOLS (BENCH FITTING)</u>		
General aim and objectives	48	12
Important tools and equipments	48	72
Activities and projects	24	156
	<u>120</u>	<u>240</u>
<u>MACHINE TOOL TRAINING (MACHINE SHOP)</u>		
General aims and objectives	72	48
Important machine tools involved	72	48
Important equipment required	60	60
Activities and projects	60	300
	<u>264</u>	<u>456</u>
<u>FABRICATION, WELDING AND CUTTING (FABRICATION SHOP)</u>		
General aims and objects	48	12
The equipment required	48	72
Activities and projects	24	156
	<u>120</u>	<u>240</u>
<u>MARINE PLANT MAINTENANCE</u>		
General aims and objects	120	120
Plant maintenance Part. 1 (Pipe fittings)	120	360
Plant maintenance Part. 2 (Machine fittings)	120	600
	<u>360</u>	<u>1,080</u>
	1,294	2,156

Proposed Plan for Post-sea Training (One Year)

Subject	Nautical department	
	Teaching hours	
	Lecture hours	Laboratory hours
Class III & IV (Three courses in a year each of 13 weeks duration)		
<u>1. NAVIGATION</u>		
(a) Coastal navigation	-	78
(b) Principles of navigation	60	18
(c) Practical navigation	40	12
(d) Radar navigation	26	26
<u>2. MARINE OPERATIONS</u>		
(a) Seamanship	16	10
(b) Watchkeeping (oral)	26	26
(c) Marine communications	6	20
<u>3. MARINE TRANSPORTATION</u>		
(a) Ship stability	39	13
(b) Ship construction	39	13
(c) Cargo handling & stowage	33	13
<u>4. METEOROLOGY</u>	65	13
<u>5. SIGNALLING</u>	13	39
<u>6. APPLIED SCIENCES</u>	65	13
<u>7. MATHEMATICS</u>	52	-
	<u>480</u>	<u>294</u>

Proposed Plan for Post-sea Training (One Year)

Subject	Nautical department	
	Teaching hours	
	Lecture hours	Laboratory hours
Class II (Two courses in a year each of 17 weeks)		
1. COASTAL NAVIGATION	-	90
2. OCEAN & OFF SHORE NAVIGATION	51	17
3. ELECTRONIC NAVIGATION SYSTEMS	50	40
4. SHIP CONSTRUCTION	36	9
5. SHIP STABILITY	60	30
6. METEOROLOGY	51	17
7. SHIP BOARD OPERATIONS	60	30
8. SHIP MASTERS BUSINESS & LAW	90	-
9. SIGNALLING	15	30
	413	263

Proposed Plan for Post-sea Training (Four Months)

Subject	Engineering department	
	Lecture hours	Laboratory hours
<u>MARINE HEAT ENGINES</u>		
The heat engine cycle	20	-
Ideal gas cycle	8	-
The rankine cycle	10	4
The marine refrigeration cycle	10	4
Resiprocating combustion engine	20	10
Emergency transfer in marine plant	12	4
Air compressors	10	8
	<u>90</u>	<u>30</u>
<u>ENGINEERING MATERIALS</u>		
Basic metallurgy	12	-
Material under load	12	4
Material testing mechanical	10	6
Material testing non destructive	12	4
	<u>46</u>	<u>14</u>
<u>ELECTRICAL ENGINEERING</u>		
Alternating current	30	4
Relative electrical machines	35	16
Electronics	25	10
	<u>90</u>	<u>30</u>

Subject	Teaching hours per course	
	Lecture hours	Laboratory hours
<u>INDUSTRIAL CHEMISTRY</u>		
Fundamentals	12	-
Corrosion of metals	10	-
Corrosion prevention	8	4
Water treatment and testing	6	6
Testing of fluids and lubricants	6	8
	<u>42</u>	<u>18</u>
<u>NAVAL ARCHITECTURE</u>		
Basic mensuration	12	-
Hydrostatics	10	-
Ship form coefficient	8	-
Elementary ship stability	10	4
Ship performance	6	-
Propellers	6	-
Construction details	8	6
	<u>60</u>	<u>10</u>
	328	102

Note:-

No. of periods stated against each topic of a subject indicates periods per course.

We intend to turn the following courses per year:-

1. Chief engineers 2 courses
2. 2nd engineers 2 courses
3. 3rd engineers 2 courses

Subject	Teaching hours per course	
	Lecture hours	Practicals on plants and simulators
<u>DIESEL PROPULSION PLANT</u>		
Basic theory	20	5
Construction details	12	5
Engine systems	18	10
Operation	10	40
	<u>60</u>	<u>60</u>
<u>AUXILIARY PLANTS</u>		
Auxiliary diesel engines	20	15
Auxiliary steam boilers	15	10
Heat transfer plant	10	-
Evaporation and distillates	15	-
Marine pumps	15	4
Air compressor machines and systems	10	6
	<u>85</u>	<u>35</u>
<u>STEERING SYSTEM</u>		
General	12	-
Hydraulic control system	6	-
Power operated hydraulic rudder system	6	-
Electrical steering system	6	-
	<u>30</u>	

Subject	Teaching hours per course	
	Lecture hours	Practicals on plants and simulators
<u>REFRIGERATION PLANT</u>		
Refrigeration cycle	5	-
Refrigeration system	7	2
Compressor details	4	2
System components	6	4
System operation	3	5
Secondary coolants	3	-
Storage spaces	2	2
	<u>30</u>	<u>15</u>
<u>FUEL AND COMBUSTION SYSTEM</u>		
Fuels and combustion in marine plants	10	5
Marine diesel engine combustion and systems	5	2
Steam boiler combustion and system	5	2
Fuel treatment	10	6
	<u>30</u>	<u>15</u>
<u>SAFETY ON BOARD</u>		
Guidance	10	-
Organization	15	-
Equipment	15	-
Operation	20	-
	<u>60</u>	
	<u>295</u>	<u>125</u>

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Note:-

No. of periods stated against each topic of a subject indicates periods per course.

We intend to run the following courses per year:-

- |                    |           |
|--------------------|-----------|
| 1. Chief engineers | 2 courses |
| 2. 2nd engineers   | 2 courses |
| 3. 3rd engineers   | 2 courses |
-





## Appendix-7

## Proposed PMA Manpower Development Plan

S. No.	Designation	Number of Post
A. GAZETTED		
1.	Commandant	1
2.	Deputy	1
3.	Officer-in-Charge, Engg. Deptt.	1
4.	Officer-in-Charge, Nautical Deptt.	1
5.	Chief Education Officer	1
6.	Engineer Instructor	8
7.	Electrical/Mechanical Engineer	2
8.	Nautical Instructor	7
9.	Education Officers	10
10.	Electronics/Computer Engineer	1
11.	Training Co-ordination Officer	1
12.	Medical Officer(Male & Female)	2
13.	Assistant to Commandant	1
14.	Hosted Warden	1
15.	Accounts Officer	1
16.	Maintenance Officer	1
17.	Store Officer	1
18.	Security Officer	1
19.	Transport Officer	1
20.	Administrative Officer	1
21.	Demonstrator, Physics Lab.	1
22.	Imam Masjid	1
23.	CPO's	10
24.	S.D.O.	1

S. No.	Designation	Number of Post
1.	Stenographer	2
2.	Foreign	1
3.	Deck Serang	1
4.	Stock Keepers	5
5.	Librarian	1
6.	Nurses(Male & Female)	6
7.	Stenotypist	8
8.	Turner/Machinists	4
9.	Welder	3
10.	Draughtman	1
11.	Fitter/Plumber	4
12.	Carpenters	4
13.	Electricians	3
14.	Refrigerator Mechanics	2
15.	Boiler Attendants	2
16.	Quarter Master	1
17.	Calligraphists	2
18.	Chief Steward	1
19.	Chief Cook	1
20.	Assistants	3
21.	Officer Superintendents	5
22.	Security Supervisor	1
23.	Tracer	1
24.	Black Smith	2
25.	Engine Driver	2
26.	Head Mechanic	1
27.	Telephone Operators	8
28.	Stewards	29
29.	Cooks	16
30.	U.D.C's	23
31.	Telephone Operator Monitor	1
32.	Laboratory Assistant	1
33.	Accountant	1
34.	Cashier	1
35.	Motor Mechanics	2
36.	Midwife	1
37.	Dispensers	3
38.	L.D.C's	37
39.	Receptionists	5
40.	Guard Commanders	4
41.	Book Binder	1

S. No.	Designation	Number of Post
42.	Head Mali	1
43.	Head Khakrob	1
44.	Drivers	10
45.	Despatch Riders	2
46.	Assistant Midwife/Nursing Aids (Male & Female)	4
47.	Duplicating Machine Operator	2
48.	Records Setter	5
49.	Cleaners/Baildars	4
50.	Lascars	13
51.	Laboratory Attendant	1
52.	Scullions	16
53.	Daftaris	2
54.	Naib Qasids	39
55.	Orderly	3
56.	Frash	7
57.	Mails	20
58.	Chowkidars	30
59.	Groundman	10
60.	M.T. Cleaner	4
61.	Khakrobs	25
62.	X-Ray Operator	1
63.	Fire Pump Attendant	2
64.	Helper	2
65.	Lab. Assistant Pathology	1



Appendix-8 Rough Estimation of Electricity Consumption

Name of Equipment	kVA		
	Max.	P.F.	Cons.
1. Radar Simulator	6.0	80	4.8
	* 5.0	80	4.0
2. Three-globe sets	-	-	-
3. Transparent celestial globe	-	-	-
4. Mini planetarium	0.1	80	0.08
5. Magnetic compass training set	0.1	100	0.1
6. Gyro compass training set	-	-	-
7. Gyro scope	-	-	-
8. Life raft	-	-	-
9. Model of typical ship	-	-	-
10. Model of hull structure	-	-	-
11. Loading calculator	0.4	100	0.4
12. Model of cargo gear	0.01	100	0.01
13. 2 cycle diesel engine			
14. Model of thrust shaft bearing			
15. Model of marine steam turbine			
16. Model of exhaust gas turbo-charger			
17. Model of marine boiler			
18. Model of various model			
19. Gears	0.3	10	0.03
20. Model of stern tube and propeller			
21. Model of controllable pitch propeller			
22. Model of side thruster			
23. Model of steering gear			
24. Model of deck machineries			
25. Model of cooler			
26. Model of refrigerator and compressor	-	-	-
27. Model of generator	-	-	-

28.	Model of (electric) motor	-	-	-
29.	Main engine starting valve	-	-	-
30.	Main engine fuel injection valve	-	-	-
31.	Main engine cylinder safety valve	-	-	-
32.	Globe valve	-	-	-
33.	Angle valve	-	-	-
34.	Gate valve	-	-	-
35.	Butterfly valve	-	-	-
36.	Check valve	-	-	-
37.	Diaphragm operated valve	-	-	-
38.	Pressure control valve	-	-	-
39.	Pilot type temperature control valve	-	-	-
40.	Reducing valve	-	-	-
41.	Electric process control experiment device	3.0	50	1.5
42.	Sensor	-	-	-
43.	Governor	-	-	-
44.	Induction regulator	5.0	50	2.5
45.	Transister circuit trainer	0.8	50	0.4
46.	Training set	0.8	50	0.4
47.	Transister and I.C. circuit trainee for instructor	1.6	25	0.4
48.	Microcomputer experiment device	0.02	100	0.02
49.	Impact tester	-	-	-
50.	Vickers hardness tester	0.1	70	0.07
51.	Brinell hardness tester	-	-	-
52.	Fuel injection tester	-	-	-
53.	Boiler water tester	-	-	-
54.	Gas analyser	-	-	-
55.	Fuel injection tester	-	-	-
56.	Redwood viscosity meter	0.6	100	0.6
57.	Saybolt viscosity meter	2.0	100	0.6
58.	Engler viscosity meter	0.6	100	0.6
59.	Planimeter	-	-	-
60.	Flow meter	-	-	-
61.	Vibration meter	-	-	-
62.	Oil hydraulic circuit trainer	1.0	70	0.7
63.	Pneumatic circuit trainer	1.5	70	1.05

64. Circuit trainer	}	0.9	50	0.45
65. Logic analyser				
66. Arc welding machine		30	50	15
67. Polishing board		1.0	70	0.7
68. VHF radio telephone		0.4	70	0.3
69. Ship maneuvering simulator		12.0	80	9.6
		* 10.0	80	8.0
70. Engine plant simulator		9.0	80	7.2
		* 10.0	80	8.0

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Total                      67.51 ≈ 70 kVA

\* ... Air conditioner's consumption included.





Appendix-9 Consumables for Training Equipment

(in Rupee)

<u>Name of equipment</u>	<u>Q'ty</u>	<u>Unit price</u>	<u>Price</u>
1. Radar simulator			
Recording paper for printer	5 boxes	610	3,050
Ink ribbon for printer	5 pcs.	430	2,150
Recording paper for x-y plotter	300 sheets	1.6	480
Pen for x-y plotter	5 sets	740	3,700
Plotting pen for radar	5 dzs.	100	500
Bulb, fuse, etc.	1 box	310	310
Floppy disket	1 box	1,000	1,000
<u>Subtotal</u>			<u>11,190</u>
2. Ship maneuvering simulator			
Recording paper for printer	10 boxes	610	6,100
Ink ribbon for printer	15 pcs.	430	6,450
Recording paper for x-y plotter	1,000 sheets	1.6	1,600
Pen for x-y plotter	10 sets	740	7,400
Plotting pen for radar	5 dzs.	100	500
Bulb, fuse, etc.	1 box	2,469	2,469
Floppy disket	6 boxes	1,000	6,000
<u>Subtotal</u>			<u>30,519</u>
3. Engine plant simulator			
Recording paper for printer	15 boxes	610	9,150
Ink ribbon for printer	20 pcs.	430	8,600
Recording paper for alarm printer	3 boxes	610	1,830
Ink ribbon for alarm printer	4 pcs.	430	1,720
Bulb, fuse, etc.	1 box	9,219	9,219
<u>Subtotal</u>			<u>30,519</u>

#### 4. Engine part tester and measurement

##### 1) Impact tester

V & U-cutter	1 pc.	2,840	2,840
10 mm gauge	1 pc.	1,690	1,690
Hammer positioning gauge	1 pc.	3,380	3,380
Specimen positioning gauge	1 pc.	2,843	2,843

##### 2) Vickers hardness tester

Bulb	1 set	100	100
Fuse	1 set	100	100
Diamond penetrator	1 set	4,830	4,830

##### 3) Brinell hardness tester

Ball penetrator	1 set	2,260	2,260
(for 5 mm & 10 mm ball)	5 pcs.	115	575
10 mm steel ball	5 pcs.	65	325
5 mm steel ball			

##### 4) Fuel injection valve tester

Window	1 pc.	1,100	1,100
Gasket	1 set	550	550

##### 5) Boiler water tester

Hardness set	1 set	314	314
PH indicator	1 set	285	285
Hydrogen measuring set	1 set	295	295
Total solid matter measuring set	1 set	285	285

##### 6) Gas analyzer

Alcohol for lamp	1 set	220	220
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##### 7) Fuel oil analyzer

L.P. gas burner	1 set	535	535
Filtration paper	1 set	270	270
Air suction hand pump	1 set	295	295
Solvent	1 set	540	540
Kerosine	1 set	500	500

8) Red wood viscosity meter			
Thermometer	2 pcs.	50	100
Dry battery for stopwatch	1 pc.	100	100
9) Saybolt viscosity meter			
Thermometer	2 pcs.	50	100
Dry battery for stopwatch	1 pc.	100	100
10) Engler viscosity meter			
Thermometer	2 pcs.	50	100
Dry battery for stopwatch	1 pc.	100	100
11) Vibration meter			
Dry battery (006P)	8 pcs.	25	200
12) Oil hydraulic circuit trainer			
Hydraulic oil	1 set	3,000	3,000
Rubber hose with quick coupling	3 sets	395	1,185
Bulb	1 set	300	300
Fuse	1 set	300	300
13) Pneumatic circuit trainer			
Bulb	1 set	400	400
Fuse	1 set	400	400
<u>Subtotal</u>			<u>30,519</u>

5. Electric part

Bulb, fuse, etc.	1 set	463	463
Spare electronic block for transistor and I.C. circuit	50 pcs.	150	7,500
Trainers	10 pcs.	210	2,100
Dry battery 1.5 V/UM-1	10 pcs.	10	100
Dry battery 1.5 V/UM-3	2 pcs.	5	10
<u>Subtotal</u>			<u>10,173</u>

6. Others

1) Gyro compass training set			
Bulb, fuse, etc.	1 set	239	239
2) Loading calculator			
Recording paper for printer	4 boxes	610	2,440
Ink ribbon for printer	3 pcs.	430	1,290
Bulb, fuse, etc.	1 set	40	40
3) Model of cargo gear			
Fuse, etc.	1 set	20	20
4) VHF radio telephone			
Bulb, fuse, etc.	1 set	40	40
<hr/>			
	<u>Subtotal</u>		<u>4,069</u>
		<u>Grand total (Rupee)</u>	<u>116,989</u>









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