NO.

Directorate General of Fisheries

Ministry of Sea Exploration and Fisheries

The Republic of Indonesia

BASIC DESIGN STUDY REPORT
ON
THE PROJECT FOR HUMAN RESOURCES DEVELOPMENT FOR FISHING TECHNOLOGY AND FISHERIES RESOURCES MANAGEMENT IN SEMARANG
IN
THE REPUBLIC OF INDONESIA

AUGUST 2000

JAPAN INTERNATIONAL COOPERATION AGENCY

SYSTEM SCIENCE CONSULTANTS INC.

KYOKUYO CO., LTD.

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Preface

In response to a request from the Government of the Republic of Indonesia, the Government of Japan decided to conduct a basic design study on the Project for Human Resources Development for Fishing Technology and Fisheries Resources Management in Semarang and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Indonesia a study team from January 19 to February 12, 2000.

The team held discussions with the officials concerned of the Government of Indonesia, and conducted a field study at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Indonesia in order to discuss a draft basic design, and as this result, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of Indonesia for their close cooperation extended to the teams.

August, 2000

Kimio Fujita
President
Japan International Cooperation Agency

August, 2000

Letter of Transmittal

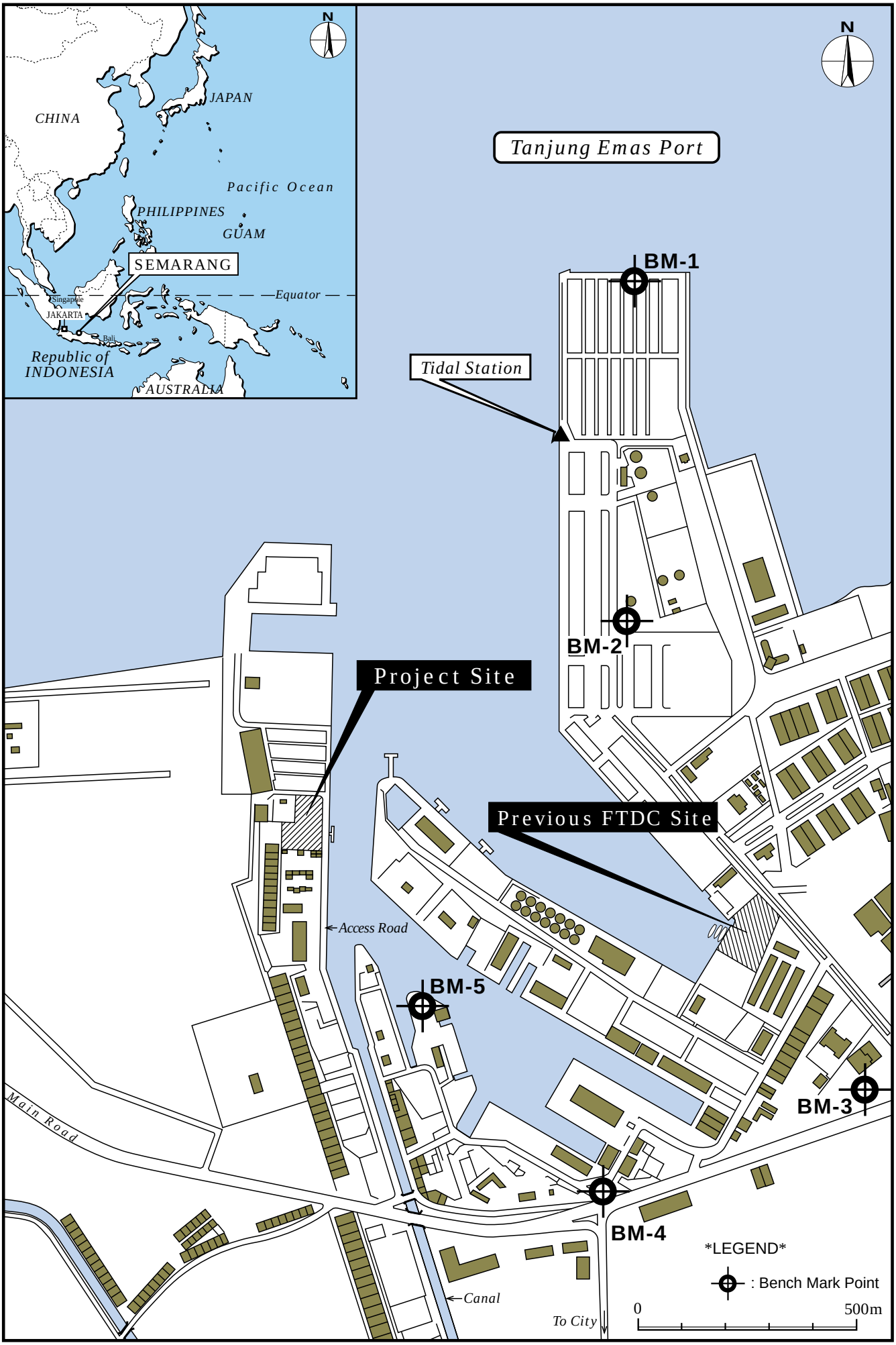
We are pleased to submit to you the basic design study report on the Project for Human Resources Development for Fishing Technology and Fisheries Resources Management in Semarang in the Republic of Indonesia.

This study was conducted by System Science Consultants Inc. and Kyokuyo Co., Ltd., under a contract to JICA, during the period from December 10, 1999 to August 18, 2000. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Indonesia and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,

Yukitaka Date
Project Manager,
Basic design study team on
the Project for Human Resources Development
for Fishing Technology and Fisheries
Resources Management in Semarang
System Science Consultants Inc. and Kyokuyo
Co., Ltd.,



LOCATION OF PROJECT SITE

Birds Eye View

Abbreviations

BPPL	Balai Penelitian Perikanan Laut
CIDA	Canada International Development Agency
CPUE	Catch Per Unit Effort
DANIDA	Danish International Development Agency
DGF	Directorate General of Fisheries
DO	Dissolved Oxygen
DSC	Digital Selective Call
EEZ	Exclusive Economic Zone
FAD's	Fish Aggregating Devices
FAO	Food and Agriculture Organization of the United Nations
FTDC	Fishing Technology Development Center
(BPPI)	(Balai Pengembangan Penangkapan Ikan)
GMDSS	Global Maritime Distress Safety System
GPS	Global Positioning System
KUD	Koperasi Unit Desa
SOLAS	International Conventional for the Safety of Life at Sea
TED	Turtle Excluding Device
UNDP	United Nations Development Programme
USAID	United States Agency for International Development

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1-1 Background of the Project Request

The Republic of Indonesia is an archipelago nation spanning east to west about 5,100km including Sumatra, Java, Kalimantan, and Sulawesi, among other 1,600 islands, and covering 1.9 million km^2 in territory. Its population is the largest in Southeast Asia, with 206 million people (as of 1996), the majority being Malay, although there are many different ethnic groups, including Javanese, Sudanese, and Sumatran. Due to its location on the equator, the climate is tropical, generally hot and humid, with little seasonal change, except for a rainy and dry season. The temperatures averages 28ºC throughout the year; the dry season lasts from April to September, and the rainy season from October to March. During the dry season, winds from the southeast blow mainly, whereas during the rainy season, winds from the southwest are more prominent.

GNP for 1997 can be subdivided as follows: Agricultural, Forestry, and Fishing Industry (15%), Mining (35%), and Construction and Services Industry (50%), although almost half of the labor force (46%) is working in the agricultural, forestry, or fisheries sector. As of 1997, 4.86 million people were working in the fishing sector.

Since 1969, a five-year economic plan has been implemented, in which the first 25 years became the constructive period of economic and social development. During this period, development plans have been promoted following the three basic principles of economic development, namely “equal distribution of development results,” “maintenance of continuous growth,” and “secure social stability.” Economic growth in the past 25 years has averaged 6.8% and per capita income levels have increased from US$70 (1969) to US$1,092 (1996).

However, since the 1997 Asian currency crisis, weakening of the local currency (rupiah,) soaring of prices, swelling of private debts, and stagnation of trade-related finance, Indonesia is on the midst of an economic depression. General fishing activities have also received a huge impact from this currency crisis. The *Crash Program*, which was conceived by the government as a countermeasure against the economic crisis, was put into effect between 1998 and 1999. The economic situation soon hinted towards recovery and by 1999, after the change of government, the program’s task was over.

Indonesia is one of the world’s prominent fishing nations (‘97 fishing capture: 4.8 million tons) and this industry plays a crucial role in providing the people with proteins, creation of labor opportunities for 5 million fishermen and other fisheries-related people, and

acquisition of foreign currency through commercial fishing of tuna or shrimp. However, 90% of the fishermen are small-scale, utilizing traditional methods, and thus their activities, resource conservation, and the techniques of fish farmers remain at a low level.

After the financial crash of 1997, a considerable number of the unemployed started to migrate to the coastal regions in search for job opportunities and this has caused some social problems. These newcomers work part-time, but because of their little experience in fishing and education, many engage in dangerous fishing methods, using dynamites and toxic substances, that endanger the marine resources and environment. Furthermore, because of the sudden increase in fishermen without fishing knowledge or experiences, negative effects of overpopulation of fishing spots 3 miles from the coast and depletion of marine resources are feared.

On December 1999, the Directorate General of Fisheries (DGF) settled on "PROTEKAN 2003," as a development project for the fisheries sector. This project stresses the promotion of fishing products exports through "Responsible Fisheries," which takes into full consideration the socio-economic situation and resource management, and indicates the increase in labor opportunities as one of the specific objectives to be attained by 2003. Furthermore, although regional provincial staff are currently executing fishing technology training programs for small-scale fishermen in order to increase labor opportunities, these consist mostly of engine maintenance and keeping. And despite training for fishing technology, tools and methods, and navigation are carried out, satisfactory results have not been attained due to poor conditions of training equipment and low competence of instructors.

The Fishing Technology Development Center (FTDC) was established in 1978 and has been engaging in technological development, research, and training in fishing. However, it was forced to move its installations due to ground subsidence, depreciation of facilities and equipment, and a request from the Port Authority for relocation. As a result, a relocation plan was established in 1996, securing the new ground within the port compound, and finishing the partial transfer of the facilities, such as the workshop building and the main building, as of 1999. However, due in part to the Indonesian economic crisis, which caused budgetary restrictions, only a portion of the facilities have been prepared, while training facilities and equipment for fishing techniques necessary for the "increase in labor opportunities," have remained untouched.

In view of these conditions, the Indonesian government requested its Japanese counterpart a non-refundable financial aid to prepare the facilities and equipment established

the “Project For Human Resources Development for Fishing Technology and Fisheries Resources Mßanagement in Semarang,” for the development and diffusion of proper fishing techniques, aimed at small-scale fishermen and staff members of regional governments, among others.

1-2 Summary of Facilities and Equipment Requested

(1) Confirmation of Facilities and Equipment Requested

The original contents of the Facilities and Equipment requested for the present Project is as follows:

	FACILITIES	EQUIPMENT
a)	Training Building Navigation training Room Fishing Machinery Training Room Engine Training Room Storage Room, others Lecture Room Lecture Room cum Conference Room Study Room Community Hall	Fishing and Navigation Training unit Fishing Machinery Training Unit Marine Engine Training Unit Lecture Equipment Workshop Equipment Multipurpose Small-Scale Training Vessel
b)	Jetty	

As a result of a reconfirmation to the Project’s executing agencies, the DGF and the FTDC, the following modifications were indicated:

- Lecture Room cum Conference Room: excluded from the request since the existing main building can be used to hold seminars.
- Study Room: will serve as a waiting room for guest instructors.
- Community Hall: renamed to “Dining Room / Kitchen” in the present Project.
- Jetty: the request for the extension of the jetty was determined to have a low priority compared to training facilities and equipment.
- Training Equipment: items that can be procured in Indonesia and are relatively inexpensive will be excluded from the current assistance project.
- Multipurpose Small-Scale Training Vessel: vessel fittings will have to be modified after confirmation and discussion on local fishing methods and tools.
- Dormitory for Trainees: since the Port Authority, which administers the port sector, has not authorized the construction of dormitory facilities for trainees, the

Project would view the use of private dormitory facilities and guesthouses for staff members.

(2) Summary of Newly Requested Facilities and Equipment

Following is the content of facilities and equipment recetly requested during the local survey:

- Trainee's Bus: a bus with a capacity of 30 people to pick up and drop trainees and as a means of transportation of trainees when conducting training activities.
- Optimization of the existing jetty: a rubber molding was to cover the docking areas, as a means of sock-absorption.
- Laboratory: a laboratory room for water-quality analysis.
- First-aid Room: a first-aid room for emergencies within the site.
- Library: a new temporary library within existing facilities.

As the result of discussion, Items to be requested by Indonesia side are adjusted as below.

	FACILITIES	**EQUIPMENT**
a)	Training Building Navigation training Room Fishing Machinery Training Room Engine Training Room Lecture Room (Classroom) Instructor's Room Dining Room / Kitchen Laboratory Storage Room, others First-aid Room Library	Fishing and Navigation Training unit Fishing Machinery Training Unit Marine Engine Training Unit Lecture Equipment Workshop Equipment Trainee's Bus Multipurpose Small-Scale Training Vessel
b)	Optimization of the existing jetty	

Chapter 2. Contents of the Project

Chapter 2 Contents of the Project

2-1 Objective of the Project

The Directorate General of Fisheries (DGF) formulated its own development plan, PROTEKAN 2003, for the fisheries sector in December 1999. The objective of the plan is to expand the export of fisheries products under leading Responsible Fisheries and thereby increase employment opportunities through Responsible Fisheries in the fisheries industry.

However, the following issues have surfaced in recent years with the Indonesian government's endeavor to promote Responsible Fisheries.

Following the economic crisis of 1997, the urban unemployed flocked in large numbers to the coastal fishing villages and this has created social problems due to the significant rise in the unemployed population in the coastal areas. Many of the unemployed have become part-time fishermen, but due to their lack of fishing experience and the nonexistence of adequate training programs, many have resorted to using dynamite and other dangerous and harmful fishing methods that have seriously affected fishery resources and the ocean environment. In addition, this sudden increase in the fishing population has led to concerns about the negative impact on coastal fishery resources and the overcrowding of the fishing grounds located within three miles of the coastline.

As a result, the DGF began providing training opportunities for fishermen with limited fishing skills and experience and has assisted them in gaining employment as crew members with offshore fishing vessels, with the aim of alleviating congestion of the coastal fishing grounds. FTDC was placed in charge of implementing technical training and educational programs for the fishing master and crew members who do not require maritime certificates, in order to increase employment opportunities - the priority objective of PROTEKAN 2003.

It is physically impossible for the center to implement educational and training programs for all fishermen operating within Indonesia's national borders. Therefore, provincial officers, as well as fishery cooperative staff members and local representatives, have been selected as trainees of these programs so they can transfer the fishing technology to the local fishermen. The "cascade approach" has been adopted where graduates of this program are responsible for the dissemination of the technical training to the local fishermen.

Hence the trainees targeted by the center are not limited to small-scale fishermen, but include provincial officers and representatives of fishermen cooperatives.

The FTDC was established in 1978 and it is responsible for developing fishing technology, conducting survey and exploration activities and fishery training programs based on these survey findings. However, due to the settlement of the port complex grounds, depreciated facilities and equipment, and faced with a request by the Port Authority (PELINDO) to move the center, a plan to relocate it within the port complex was prepared in 1996. A segment of the new facilities was completed in 1999 and the center was relocated.

However, the core fishery training facilities and equipment of the new center have not been constructed due to budgetary constraints in the aftermath of Indonesia's economic crisis. Despite the demand for fishery education and training programs, the provision of lecture and training rooms and other educational facilities essential to the training and survey functions of the FTDC, navigational measuring instruments, fishing machinery, and other training equipment, as well as a training vessel and other hardware have lagged. Hence the center has been unable to implement effective training activities.

This Project aims to augment the educational and training activities of the FTDC by providing the lacking facilities and equipment, in order to disseminate improved fishing skills through training programs among local fishermen and government officials. This is in accordance with the PROTEKAN 2003 policy of fostering human resources with improved fishing skills and to generate employment opportunities.

2-2 Design Concept of the Project

2-2-1 Activities of the FTDC

(1) Role and Function of the Center

The FTDC fulfills the following two functions.

a. Improvement on fishing technology and survey

The FTDC conducts short and long-term improvement on fishing technology and survey activities in coordination with the DGF, the Jakarta Fishery Research Center (BPPL), the regional directorate of fisheries, and other relevant institutions. Improvement on fishing technology and survey activities encompass diverse themes

such as marine environment, fishery resources, fishing gear/fishing methods, boat construction, etc.

b. Training stemming from improvement on fishing technology and survey activities

Based on the information obtained from the center's improvement on fishing technology and survey activities, training activities targeting provincial officers and small-scale fishermen will be conducted utilizing the technical training equipment provided by this Project.

The flow chart of the role and training activities of the center is shown in Fig. 1.

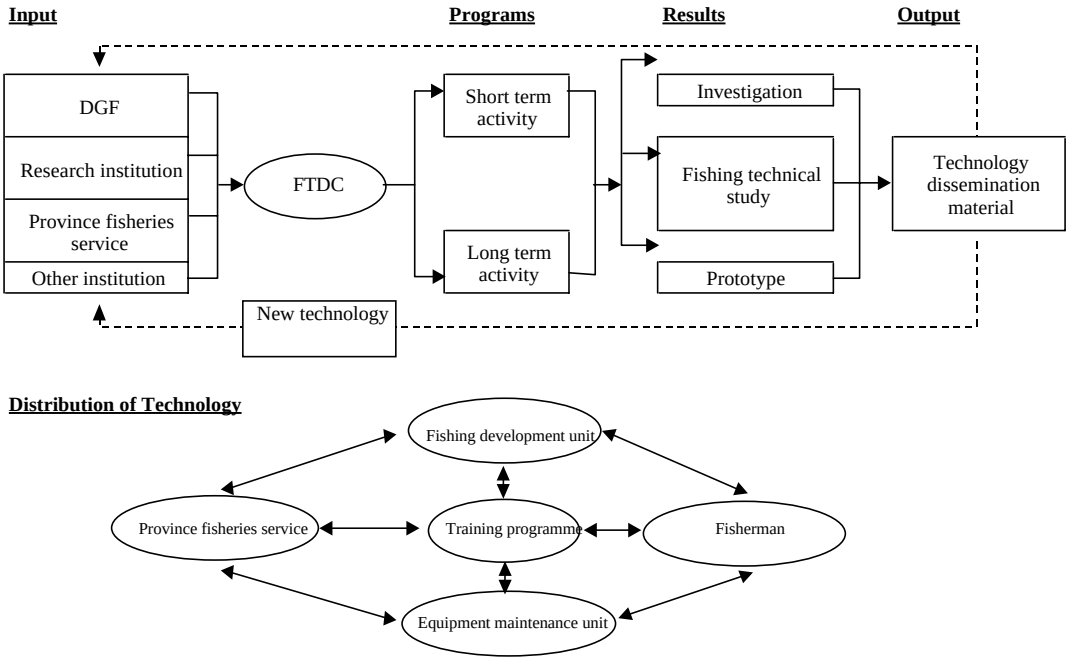


Fig.1 Flow of Dissemination of Fishing Technology

(2) Past survey and training activities

1) Survey activities

The FTDC has conducted basic survey and exploration activities that have targeted the development of fishery technology and promoted responsible fisheries through surveys on fishery resources, the marine environment, development of fishing gear and methods, development of fishing villages, fishery management, construction of prototype fishing boats, etc. Past survey and exploration activities of the FTDC are shown in the following Table 1.

Table 1 Past Survey and Exploration Activities of the FTDC (1994-1999)

Year	No	Activities
1994	1	Identification, recording of fish resources in Central Kalimantan, East Kalimantan, Bali, South sumatera.
	2	Utilization and the handling of fishing resources in Java sea
	3	Utilization and the operation of pelagic fish resources in the over exploited area and to optimize the small scale fisherman income
	4	Testing and introducing the technology of with aromatic supporting equipment in Maluku Tenggara
	5	Identification of fiberglass vessel as prototype model of fishing boat for the small scale fisherman
	6	Investigation , Identification level of demersal fish resources in the Arafura Sea by MV. Bawal Putih I
	7	Investigation , Identification level of utilization of pelagic fish resources in the Timor area by MV. Tengiri
	8	Testing and introducing the modification of trammel net in the transmigration area of Irian Jaya
	9	Testing of drift gillnet in East Kalimantan
	10	Making fish catch in utilizing the demersal fish in live condition
	11	Testing and introducing small pelagic fish by using BOUKWE AMI in the Nusa tenggara Barat waters
1995	1	Identification of utilization of the demersal fish resources in South Kalimantan
	2	Survey on the flying fish egg
	3	Testing drift gillnet
	4	Testing on fiberglass vessel by drift gillnet and mini long line
	5	Test of the prototype longline vessel in EEZ by MV. ALBAKORA
	6	Introducing the shark catching technology in Central Sulawesi
	7	Designing demersal seine in East Kalimantan, Maluku Sulawesi Tenggara and Irian Jaya
	8	Observation on utilization in Danau temp of Sulawesi Tenggara waters
1996	1	Modification of gillnet in transmigration west Klimantan waters
	2	Identification of demersal fish resources in West Kalimantan by SFDP-03
	3	Modification of flying fish egg collecting gear
	4	Modification of the coral trans plantation in the critical waters of North Java
	5	Visualization of modification about FTDC activities
	6	Identification of shrimp bloodstock and fish in the North Jawa waters
	7	Identification of potential squid resource in Nusa Tenggara Barat province
	8	Modification of rumpon phase I in West Sumatera waters
	9	Modification of napoleon fish in Aceh, Riau and Irian Jaya
	10	Development model of fishing village in the coastal area of Jambi
1997	1	Design of crew dormitory / cabin
	2	Modification of catching unit and shrimp in South Irian Jaya waters
	3	Modification of fiberglass vessel for small scale fisherman in high wave areas
	4	Modification of purse seine for fisherman transmigration in West Kalimantan waters
	5	Modification of rumpon in the abandoned area of South Java
	6	Training skill especially of technical beach dogol equipped by TED
	7	Survey of identification of main groupers and shrimp in North Java waters
	8	Identification of demersal fish resources in South central Kalimantan by SFDP-03
	9	Survey on flying fish egg business in South Slawesi
	10	Catching and handling of shrimp bloodstock in Nusa Tenggara waters
	11	Alternative design on the ornamental fishing gear in the Kepulauan Seribu
	12	Development model of fishing village in the coastal area of Jambi phase II
1998	1	Design of Main building of FTDC
	2	Identification of demersal fish resources in Southern part of East Sumatera by SFDP-03
	3	The utilization of squillament and the observation of environment habitat of coastal East Sumatera
	4	Modification of mini purse seiner and under water lamp for small scale fisherman in Nusatenggara waters
	5	Mapping on potential fish resources, reconsideration of seine and floating facilities
	6	Survey of identification of main groupers and fish resources in East Kalimantan
1999	1	Model of development in catching fish in coastal village in East Kalimantan waters
	2	Modification of design of longline and purse seine in the West Kalimantan waters
	3	Identification of over exploited of fishing in Java waters
	4	Identification of small pelagic fish resources in Indian ocean/ West Sumatera
	5	Survey of identification and mapping of Black tiger resources in Nusa tenggara waters

2) Training activities

The training activities of the FTDC from 1996 to 1999 are shown in Table 2.

Table 2 Training Record of the FDTC

O Officials, Local institution(KUD)
LF Local Fishermen
P Private sector, and student

Month	Activities	Course duration	O	LF	P	total	Remarks
1996							
12	Training on small scale agribussiness on fisheries	2weeks		90		90	Local fishermen from Tegal, Central Java
		Total	0	90	0	90	person
1997							
2	Training on small fishing vessel design and construction	1 month	45			45	Field techniciants for fishery from 26 provinces and SFD
3	Seminar on fishing village devlopment model at along coastal area of Jambi		40	35		75	Local fishermen and fisherie's officals from Jambi
7	Training on skill promotion of trawl net equiped with TED	2 weeks	40			40	Field techniciants for fishery from 26 provinces and DGF
12	Expose and fishing demonstration on bottom set net fishing at Kuala Tungkal	1 week		60		60	Local fishermen from Kuala Tungkal (Sumatera)
		Total	125	95	0	220	person
1998							
3	Seminar on the performance of fishing gear technologies produced by the project of fishing technology development. 1997/1998	1 day	75			75	Local institutions related from Central Java
4							
		Total	75	0	0	75	person
1999							
2	Training on fishing vessels licensing with respect to the technical knowlege of fishing vessels	2 weeks	25			25	Fishery officials from fishery provinces of all Indonesian area
3							
4							
5	Seminar on responsible fishing development strategy to support the fisheries product export promotion program in 2003	1day	75			75	Local institutions rerated from Central Java
6							
10	Seminar on fishing village development model at along coastal area of Eastern Kalimantan	1day	40	35		75	Local fishermen and fishery's officials from East Kalimantan
11	Seminar on coastal fishing interaction and environmental management	1day	100			100	Local institutions related from central Java, DGF.
12	Seminar on the performance of fishing gear technologies produced by the project of fishing developmnet 1998/1999	1day	100			100	Local institutions related from central Java, DGF.
	Seminar on the marine fisheries HRD facing millenium III	1day	40			40	
		Total	380	35	0	415	person

Remarks: Responsible fishing refers to FAO Code of Conduct for Responsible Fisheries

As can be seen from the table above, the FTDC conducted educational and training activities for 75 to 400 people from 1996 to 1999. The low number of trainees for the period from 1996 to 1998 is due to the flooding that occurred at the former center site and its consequent transfer to the present location.

The training activities have included the development of fishing gear and methods, development of fishing villages, fishery management, construction of prototype fishing boats, and others. All activities are based on the survey findings and exploration activities listed earlier, and seminars and training courses aimed at

promoting and disseminating Responsible Fisheries and fishing technology development are also conducted.

2-2-2 Training Plan

(1) Training Plan

1) Training subjects

In accordance with the objective of PROTEKAN 2003 to foster human resources, the aim of the FTDC is to foster fishery-related personnel such as fishing masters and general crew members who do not require a maritime certificate. As a result, the FTDC has formulated a training plan for fisheries and the following three groups of trainees have been targeted as shown in Table 3.

Table 3 Target of TDC Training

Targeted Group	Training Approach
a. Small-scale fishermen	Direct training approach
b. Provincial government officers, fishing cooperative (KUD) staff members	Indirect training based on the cascade approach
c. Employees of private fishery companies, students	Direct training approach

As shown in Table 3, small-scale fishermen, employees of private companies, and students have been earmarked for direct training by the FTDC, and provincial government officers and fishing cooperative staff members are expected to disseminate the training received from the FTDC to local fishery-related personnel, in accordance with the scheme to foster personnel through an indirect approach.

Approximately 500 trainees will participate in the FTDC fishery-training plan for the period of 2002-2004 and the number of trainees according to year is shown in Table 4.

Table 4 Number of Trainees

Year	Annual Estimated Number of Trainees
2002	500
2003	540
2004	560

2) Content of the educational/training program

The FTDC training courses are comprised of the short-term courses such as one to two-day seminars and long-term courses such as the one week to two-month term courses. The content of these seminars and courses are divided into the three categories as shown in Table 5. The basic training menu consists of a total of 24 subjects - 12 short-term seminars and 12 long-term courses.

Table 5 Training Categories

Training Category	Short-term Seminar	Long-term Course
1. Responsible fishing	6	5
2. Fishing technique	6	4
3. Nautical knowledge	--	3
Total	12	12

Remarks: Responsible fishing refers to FAO Code of Conduct for Responsible Fisheries

A breakdown of the three training categories is given in Table 6.

Table 6 Categories of Training

	No.	Title of training	Duration
I. Long-term Course	**100**	**Responsible Fisheries**	(day)
	101	Responsible fishing operation	30
	102	Fisheries control and fishing boat inspection	30
	103	Workshop on fishing strategy	7
	104	Workshop on ghost fishing technology	7
	105	Workshop on Bycatch reducing device (BRD) in trawling	14
	200	**Fishing technique**	
	201	Small scale fishing gear and deck machinery	21
	202	Artificial reef and FAD rumpon technology	21
	203	Workshop on fish handling and fish hold	7
	204	Small scale fishing vessel design and construction	30
	300	**Nautical knowledge**	
	301	Fishing electronic, radio and navigation equipment	30
	302	Special training for high sea fishing vessel crew recruitment	60
	303	Diesel engine operation and maintenance	30
II. Short-term Seminars	**400**	**Responsible Fisheries**	
	401	The future of high sea Indonesian waters fishery	1
	402	Resources exploitation and marine environment	1
	403	Coastal fishing monitoring and controlling	1
	404	Tuna resources status in Indonesia	1
	405	Strategy for the future of fishing business by small scale in	1
	406	Fishing industry development strategy	1
	500	**Fishing technique**	
	501	Fishing technology development strategy in Indonesia	1
	502	Fishing technology update	1
	503	Fishing zone in JAVA sea	1
	504	Development small scale fisherman	1
	505	Fish catch production trend in the world	1
	506	Small scale fishing technology	1

The basic training menu shown above will be adjusted according to the number of trainees, the region targeted, etc.

3) Annual plan

A summary of the FTDC training plan according to years is given in Tables 7 and 8, and the details of the training plan and curriculum year are given in Appendix 6.2.2.

Table 7 Summary of the Fisheries Training Plan

Year	No. Of Seminars*	Course	Training Days	Total Number of Trainees
2000	4	2	71	290
2001	5	4	132	400
2002	1	9	236	500
2003	2	9	245	530
2004	2	10	243	560

* Seminars are one-day; training courses are 7 to 60 days.

Table 8 Number of Trainee by Course

Year	Responsible Fishing	Fishing Technique	Nautical Knowledge	Total (persons)
2000	160	130	0	290
2001	310	60	30	400
2002	150	205	145	500
2003	230	210	100	540
2004	80	330	150	560
Total	930	935	425	2,290

4) Appropriateness of the training plan

a. Relevancy to PROTEKAN 2003

PROTEKAN 2003 has targeted increased employment for 227,000 people by 2003 in the fisheries sector. A breakdown of this targeted figure is shown in Table 9.

Table 9 Target of Human Resources Development in the Fisheries Sector

	Fishing type	Deck officer	Engineer	Fishing master	Crew	Total
1	Tuna Longliner	820	820	410	5,330	7,380
2	Pole and line	1,163	1,163	0	7,923	10,249
3	Purse seiner	14,493	14,493	863	100,506	130,355
4	Bottom longliner	6,600	6,600	0	33,000	46,200
5	Gillnetter	5,040	5,040	0	20,160	30,240
6	Hand line	0	0	0	3,020	3,020
	Total	28,116	28,116	1,273	169,939	227,444

The FTDC is responsible for fostering fishing masters and general crew members who are mainly engaged in offshore fisheries and who do not require maritime certificates. Of the three training categories established by the FTDC, the nautical knowledge category is highly relevant and in accordance with the objectives of PROTEKAN 2003.

b. Review of past training activities

The training activities implemented from 1996 to 1999 are shown in Fig. 2, and the number of trainees estimated under the training plan for 2000 to 2004.

Despite the fact that the number of trainees decreased temporarily in 1998, it has increased steadily since 1996 and there were 400 trainees in 1999.

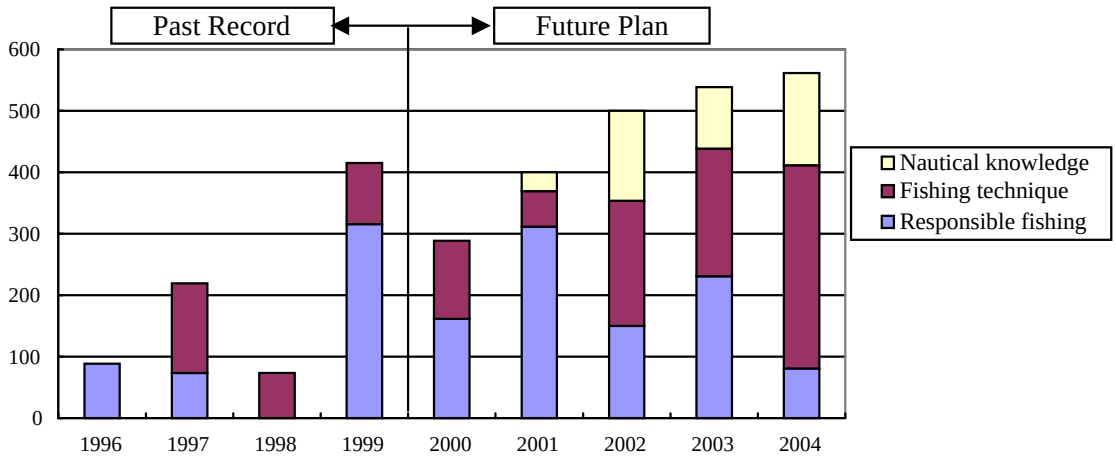


Fig.2 Transitions in the Number of FTDC Trainees

Approximately 300 to 500 trainees are anticipated under the training plan after 2000. In particular, 500 trainees are expected after 2002 when this Project is implemented. This is not a formidable estimation in view of the center's past achievements.

In a review of the training content, priority was given to the two categories of responsible fishing and fishing technique until 1999. But the training plan in future will focus on all three categories as shown in Fig. 3.

A record of FTDC training activities from its establishment in 1978 to 1995 is given in Appendix 6.2.1.

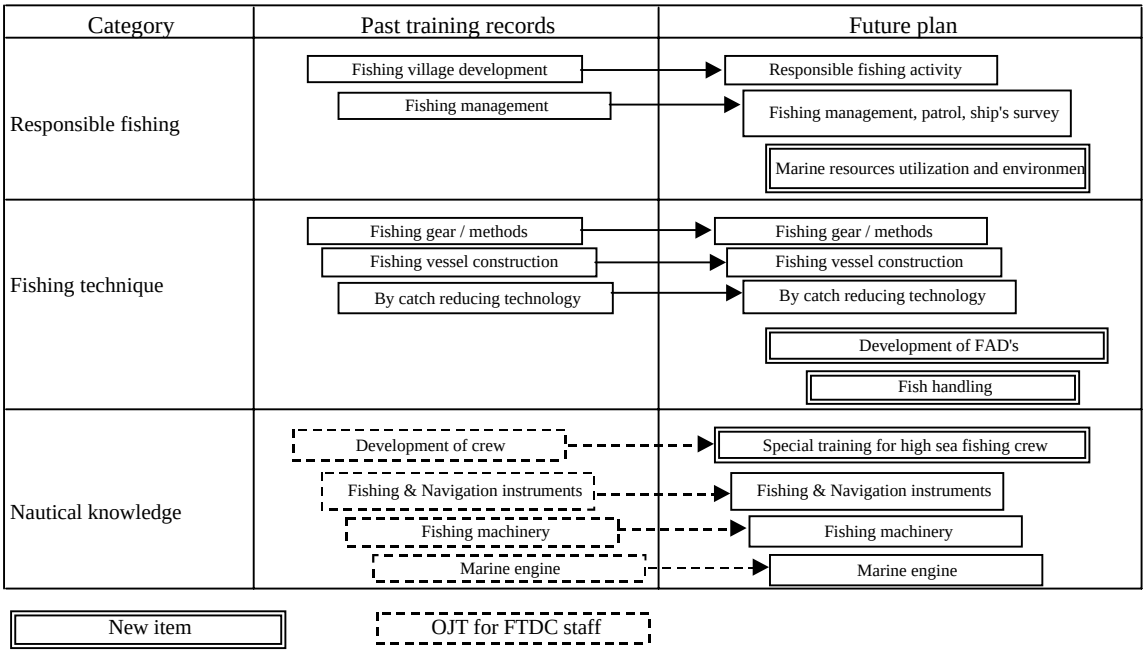


Fig.3 Comparison of Past and Future Training Activities

Fishermen who were hitherto solely engaged in small-scale fisheries needed to have only basic knowledge of fishing gear and methods, but in order for these fishermen to engage in offshore fisheries as crew members, they must acquire the knowledge and skills of a fishing technician, i.e., the skills required to operate navigational instruments and marine engines, handle fishing equipment, etc.

The FTDC has conducted some practical training sessions to foster fishing technicians on board the center's fishing vessel. But due to the old and depreciated loading equipment of the fishing vessel and the lack of training equipment on land, adequate training sessions have not been possible.

Due to these circumstances, the focus of the FTDC will be to incorporate new sessions aimed at fostering fishing technicians under a new training plan which will be implemented in this Project.

The above idea is reflected by the DGF policy to shift the coastal fishermen into employment on offshore fishing boats to alleviate the negative impact on coastal fishery resources stemming from congested coastal fishing grounds, which was

brought on by the sudden rise in the fishermen population since the 1997 economic crisis. It also meets the aim of the PROTEKAN 2003 to raise employment.

c. Review of the FDTC personnel

Of the 159 FDTC staff members, 27 have been selected as trainers for the training sessions. Based on the educational background, qualifications, field of specialty, and past experience, the number of the FDTC staff and their technical levels are adequate to implement the training programs.

	Qualification of FTDC Trainer	
	University graduate	4
	College graduate: Fisheries course	21
	Graduate school (Master)	2
	Total	27 *

*11 staffs have on board experience of fishing vessel and have maritime certificate

	FTDC Trainer Specialty		
Fishing Stock	(Rescues, Environment)	Responsible fishing	10
Fisheries Technology	(Fishing gear and equipment, Ship construction)	Fisheries Technique	9
Fishing Vessel	(Navigation, Engine, Electricity)	Nautical Knowledge	8
	Total No. of Trainer		27

A minimum of two trainers has been allocated for each training category. If trainers specialize in a course, the number of trainers would still be sufficient since courses will be conducted in morning and afternoon shifts. Table 10 shows the number of trainers by course in each training category.

Table 10 Number of Trainer by Course

Training Category	No. of Trainers	No. of Courses	No. of Trainer/ No. of courses
Responsible Fishing	10	5	2.0
Fishing Technique	9	4	2.3
Nautical Knowledge	8	3	2.7

5) Operations plan, training budget

The training programs at former FTDC facilities and the existing facilities are still in operation and the operational costs for the five-year period of 1996 to 1999 are covered by the DGF's development budget (Table 11).

Table 11 DGF Development Budget (1996-1999)

Unit: 1,000Rp

Year	DGF Development Budget
1996	98,730
1997	62,891
1998	150,000
1999	N.A.

The newly proposed training plan targeting fishermen, provincial officers, and others will go into effect in 2002. A preliminary estimation of the costs of the new FTDC training plan from 2001 to 2004 is shown in Table 12. As can be seen, the cost for one trainee/day has been estimated at 57,000 to 61,000 Rp. The details of the preliminary estimation of the training costs are given in Appendix 6.2.4.

Table 12 Estimated Cost of Training (2001-2004)

Unit: 1000 Rp.

Year	Training Cost	DGF Support (70%)
2001	245,644	171,951
2002	671,173	469,821
2003	692,659	484,861
2004	727,879	509,515

The budget for the new training program will greatly increase over past budgets (150,000,000 Rp. : 1998) and it will be mainly provided by the DGF. However, 30 percent of the operating cost will be supported by revenue from fishery cooperatives and local governments. This type of arrangement is presently implemented for a similar facility, the Semarang Maritime Academy. The DGF covers 70 percent of the training cost; and the financial resources are revenue generated from fishing license fees, the Skill Development Fund for foreign workers, and others. The budget for training costs generated after 2000 will be procured.

According to the management and maintenance plan, disbursements will be divided between the existing and new facilities.

(2) Training Demand (Questionnaire findings)

In an attempt to ascertain the demand for an FTDC training program, the sharing of training costs, the current state of extension activities for fishermen, etc., a questionnaire was distributed to the Provincial fisheries offices in 27 provinces during the field study period and 14 provinces responded.

a. Demand for a training program

According to the findings of the questionnaire, six provinces have pointed out the lack of training facilities and equipment; four provinces have indicated the lack of practical training sessions; three provinces have requested comprehensive educational materials; and four provinces have specified the need to improve the skills of the trainers.

b. Participating in the training sessions and assuming the cost

All of the 14 provinces that responded to the questionnaire indicated their wish to participate in the training program and 13 provinces explicitly specified their preference for training in fishing gear and methods. Seven provinces responded positively to either assuming or procuring the training cost. The amount of revenue which the provinces were willing to contribute ranged from 500,000 to 3,000,000 Rp; and it is surmised that if prior notice is given, the provinces will be able to prepare the revenue to cover the training cost.

c. Training conditions of fishermen and others

Local officers of 14 provinces have provided training for local fishermen and staff members of fishery cooperatives in the past and the majority of the provinces have implemented annual training sessions for 100 to 400 people. In addition, 11 provinces have drafted a fishery technology extension plan. The training sessions by 11 provinces have mainly focused on maintenance and management of engines, followed by fishing technology, fishing gear and methods, and navigational training.

Based on the findings above, there is a high demand for an educational and training program for local officers, fishermen, and staff members of fishery cooperatives, as well as comprehensive training facilities and equipment. Additionally, contributions ranging from 500,000 to 3,000,000 Rp for training costs can be expected, if prior notice such as announcements and publicity of the training content is given. This is equivalent to a coverage of 57,000 to 61,000 Rp per trainee or 30 percent of the training cost (17,000 to 18,000 Rp/day) for a 27 to 166 day training period.

In view of the past training activities that have been carried out in each province, it is anticipated that FTDC training activities will enable provincial officers to disseminate fishing technology to local fishermen and fishery cooperative staff members through extension activities.

2-2-3 Facilities Plan

(1) Countermeasures Against Ground Settlement

1) Ground settlement conditions

a. Existing building structures at the Project Site

The Project Site was originally a seaside culture pond that was reclaimed 20 years ago when the Tanjun Emas Port was constructed. The road and stone quay in front of the site were also built at that time.

The existing building structure was left untouched and the current ground height was filled about 3m in 1995. Presently, it is about 1 to 1.3m higher than the road in front of the site. According to the engineer who designed the buildings at the site, a PC piling was utilized for the three-storied building and the height of the first floor (GL+1.5m) was raised in anticipation of a consolidation settlement of 2cm to 5cm annually. This would enable to the building to withstand settlement for several decades. The facility layout surrounding the site and its level is given in Appendix 6.3.1.

b. Front road

The road was constructed when the landfill was executed in the 1970s, but due to ground settlement, the road has been raised several times in the past. It was last raised in 1994, but due to continuous settlement, flooding occurred several times a month during high tides. The Port Authority is presently planning to raise the road approximately 60cm and the construction cost will be included in the FY2000 budget.

Other main roads within the port complex have also been raised periodically and roads which are frequently used by heavy vehicles are raised once every few years.

c. Boatyard Office (adjacent to the north side of the site)

The building is a one-story steel-frame structure that was built in the 1980s and presently, irregular settlement has not been observed. It is about 1m lower than the Project site; and consequently, the floor is flooded about 5cm during high tides in the rainy season.

The area surrounding the building was repaved a few years ago; it is therefore suspected that the building and the surrounding area are sinking. Presently, countermeasures to cope with ground settlement have not been taken.

d. Ice plant (adjacent to the west side of the site)

The ice plant, which began operations in 1972, is a one-storied steel frame building with a second floor included in its structure. Part of the plant complex began experiencing flooding during high tides about ten years ago. Presently, the ground level is 1.0 to 1.5m lower than the Project site. As a countermeasure against flooding, the ground level has been raised several times in the past ten years and the level of the first floor of the building has been raised about 30 to 40cm. Although flooding occurs several times a year, countermeasures have been taken to prevent the disruption of the plant's operations.

e. Container storehouse (adjacent to the south side of the site)

The storehouse is a one-storied steel frame structure with a 20m span that was constructed in the 1990s. Irregular settlement has not been observed, but part of the location is inundated during high tides in the rainy season.

The containers are kept in a high area of the storehouse as protection against flooding.

f. General port office (in the port area)

The old facilities (constructed more than 20 years ago) have become lower than the road surrounding them. As a result, the floors are inundated during high tides and many measures to raise the ground level to prevent flooding have been taken.

Countermeasures against ground settlement were taken for the recent facilities (constructed about 10 years ago), thus having high floors over elevated ground (GL+50cm to 1cm) in comparison to the road.

g. Private shipyard (in the port area)

The shipyard office, which was built in the 1980s, is a two-storied, steel-reinforced concrete and steel-frame mixed structure, which floods during high tides due to ground settlement. Effects of irregular settlement have been observed in a segment of the plant roofing (steel-frame structure).

As a countermeasure, the ground around the structure was raised (40cm) and paved one year ago. A water stop wall 30cm in height was also installed against flooding near the entrance of the building.

2) Countermeasures against similar problems in Japan

There is a private recreational facility located on reclaimed land bordering the Tokyo Bay that has taken countermeasures against ground settlement. Sand piles were embedded throughout the weak ground to accelerate settlement and a steel-frame structure was then constructed on the upper surface. Among the existing facilities, some have incorporated lifters in their foundation, although the foundations of the

facility under construction is supported by pre-cast concrete piles 30 to 70m long (friction or supporting piles, depending on the building). There are also cases where the initial ground settlement during construction has been taken into consideration. Among these measures against future ground settlements are the use of mat slab foundations, adjustable steel braces with lifters, and extended anchor bolts.

In addition, polyurethane foam is buried at a depth of 1 to 3 meters during pavement works surrounding the building. This is done to alleviate the ground weight and pavement is laid one meter above the roadbed to reduce the settlement.

3) Analysis of the boring surveys

The ground level of the Project Site was filled up about 3.0 meters in 1995 and it is presently 1.5 meters higher than the front road. Boring was conducted at four positions of the Project Site during the local survey. Land borings at BH-1 (GL-80m) and BH-2 (GL-40m), were conducted within the FTDC site, and the marine borings, BH-3 (GL-40m) and the BH-4 (GL-40m), were carried out at the projected jetty extension site.

The results of boring survey and laboratory test of soil samples, the soil profile of land boring and marine boring are shown Table 13 and Table 14.

Table 13 Soil Profile of Land Boring

Depth	Soil	N value
0 / - 6m	Sandy silt, mixed with some gravel, Brown and gray (Boulder, hard, block, Black)	2 - 8
/ - 24m	Clay, soft, mixed with shell fragments and organic matters, Gray	1 - 5
/ 40m	Clay, stiff to very stiff, Grayish brown	13 - 24
/ - 73m	Silty clay, mixed with some sand, very stiff, Brown gray	5 - 21
/ - 80m	Gravel, sandy, very dense, Blackish gray	Over 30 - 60

Table 14 Soil Profile of Marine Boring

Depth	Soil	N value
0/ - 2.5m	Silty fine sand, very loose, Gray	0
/ - 21m	Silty clay, very soft, mixed with some shell fragments, Gray	0 - 3
/ - 40m	Silty clay, stiff to very stiff, Dark gray	10 - 25

According to the findings of the BH-1 test conducted in the building, it was found that incomplete consolidation was up to GL-70m. In addition, in a review of the Port Authority soil investigation survey findings, the diluvial clay level with complete

consolidation was found at a depth of greater than GL-26m and it has been concluded that over-consolidation exists. Although these boring locations are distant from the Project Site, the old landfill of Semarang Port was executed almost at the same time as the FTDC site. Therefore, the data will be reviewed for its applicability to the Project Site.

Consequently, both the incomplete and complete consolidation of the clay layer when the ground level is raised 3.0 meters and deeper than GL-26m will be calculated in the proposed building plan.

The estimated volume of consolidation settlement is given in Appendix 6.3.2.

4) Optional building structures and foundation plan

Due to the weak ground and the demand for long-term maintenance-free facilities, the following optional building structures and foundations (Fig. 4) have been studied.

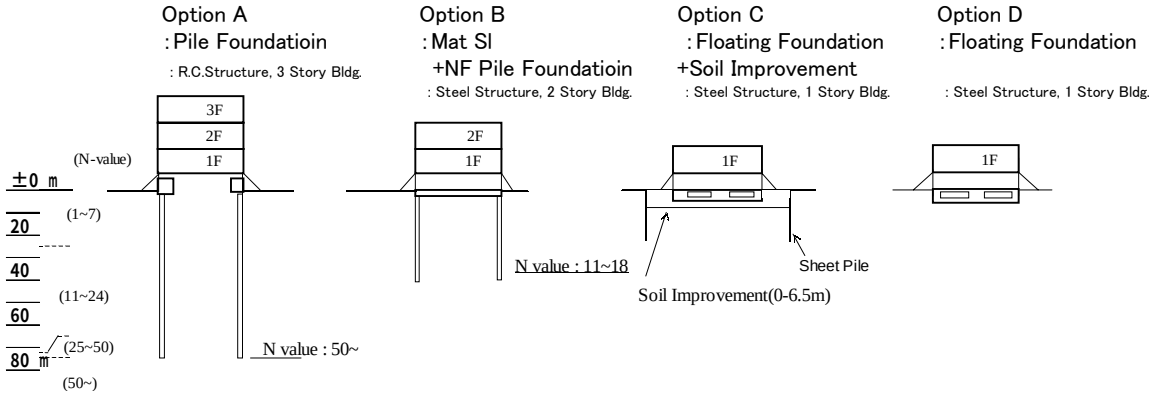


Fig.4 Optional Building Structures

Option A: The upper structure is a RC three-storied building with an independent foundation and a 75m negative friction piling (NF piling).

Option B: The upper structure is a two-storied steel frame structure with a mat slab foundation and a 40m NF piling.

Option C: The upper structure is a one-storied steel frame building with a floating foundation and a GL-6.5m and the ground will be replaced with gravel, etc., thus improving the foundation.

Option D: The upper structure is a one-storied steel frame building with a floating foundation.

The option with the least structural settlement is Option A, which utilizes a piling length of 75 meters capable of coping against liquefaction and negative friction. However, procuring the construction machinery locally is anticipated to be difficult

and if the machinery and equipment is procured from Japan, the construction costs will increase. In addition, the disparity between the settlement levels of the surrounding ground and other facilities will grow. The need for frequent maintenance measures against ground settlement is the highest.

The plan with the second least structural settlement is Option B, which utilizes a piling length of 40 meters and NF piling similarly to that of Option A. In order to reduce ground settlement, the weight of the upper structure is reduced and the highly rigid mat slab foundation is used to avoid segmented settlement. Construction machinery and materials can be procured locally, but the need for frequent maintenance measures against ground settlement is very high.

Option C minimizes the effect of structural settlement by utilizing a floating foundation, but the upper foundation has to be replaced to counteract liquefaction. However, by replacing the existing ground with gravel, etc., the settlement amount increases due to the rise in ground weight. In addition, the constant water contact due to its location near the seashore, and the wide and deep area requiring foundation improvements, requires the use of sheet piling, etc. that will greatly increase construction costs and is therefore, uneconomical. However, the need for frequent maintenance measures against ground settlement is low in comparison to the other plans.

Option D also utilizes a floating foundation as in Option C, but does not include measures to replace the upper foundation to counteract liquefaction and allows for natural settlement to occur. There is no record of liquefaction produced by earthquakes in Semarang and it is unrealistic to incorporate countermeasures against this condition solely for this facility, thus this countermeasure has not been included. In addition, since the structural settlement amount is equivalent to natural ground settlement, the need for frequent maintenance measures against it is the lowest and thus maintenance costs are also the lowest.

However, based on the findings of the boring test, it was confirmed that the old structural foundation ranges from -3m to -4.3m. The potential of this old foundation to be the cause of irregular settlement is high and therefore, it will be removed.

Based on a comparative review of the four options described above, Option D offered the most suitable building structure, and it was selected in terms of economic viability and easy management and maintenance.

The ground of the coastal region of the Java Sea is weak in many areas and ground settlement is also a problem in the coastal region of Jakarta. Since the ground of the entire Tanjun Emas port area in Semarang, including the ground at the Project site is weak, countermeasures against ground settlement are taken for the building's construction. Among these, placing the first floor at a higher level, leading to lower-cost maintenance measures of ground fill-up around the building according to the amount of settlement, and maintenance, such as re-pavement, have been determined.

In the Project plan, the amount of the building and ground settlement of the surrounding area has been calculated as equivalent, but if a disparity in settlement levels occurs, leaving the area surrounding the building unpaved and raising the ground where settlement has occurred will keep maintenance costs to a minimum. The pipes in the building will be hung under the flooring and the water tanks will be connected to the foundation structure in order to settle down with the building. In addition, flexible joints will be used to connect the pipes, in and out of the building.

A comparison of the alternative building structures and foundations is given in Appendix 6.3.3.

(2) Training Building

The roles of the existing and planned facilities are clearly shown in Table 15 and their respective purpose and functions do not overlap.

Table 15 Existing Facilities and Requested Facilities

<Existing Facilities>		
Facilities	Purpose/Outline	User
Main building	Director's room, Office, Meeting room, Seminar room	Director Administrative staff
Crew building	Office, Library (temporary use) Chapel (temporary use)	Trainers Resource Environmental Conservation staff Survey and exploration staff
Fishing gear storage	Storage of Fishing gear, machinery and materials.	Administrators
Workshop building	Maintenance of ships. Machinery training. Development of fishing gear. Office.	Workshop staff Trainees
<Requested Facilities>		
Facilities	Purpose/Outline	User
Navigation training room	Navigation training	Trainers. Trainees.
Fishing machinery training room	Fishing machinery training	Trainers. Trainees.
Engine training room	Engine training	Trainers. Trainees.
Lecture room	Lecture, Audio-visual	Trainers. Trainees.
Instructor's room	Lecture preparation	Visiting instructor
Library	Library administration Reading	Trainees. Visiting Students
Laboratory	Water Analysis	Trainers.
Dining room / kitchen	Lunch, Lounge	Trainees.
First aid room	First aid Treatment	First aid staff

The library is provisionally located in the existing crew building in an area which was originally allocated as the office for waiting crew members. Under the Project, the library will be transferred to the requested facility (training building) and the existing library will be renovated into an office for crewmembers as originally planned.

1) Training room

The former FTDC conducted training sessions in fishing machinery, engine maintenance and repair, navigational training, etc. for a segment of the government officers in the past. Presently, a course in making fishing gear (for students from Semarang University and two others) is held at the existing facilities of fishing gear storage. The FTDC has been unable to implement training courses for fishermen and

local officers in accordance with PROTEKAN 2003 due to the poor conditions of the training room.

The types of training equipment for the FTDC training curriculum for 2002 to 2004 are shown below. As it can be seen, the types of equipment differ, and there is a large number of stationary equipment which makes them impossible to move from lecture to lecture. Therefore, three training rooms to conduct navigation training, fishing machinery, and engine training courses will be required as shown in Table 16.

Table 16 Requested Training Equipment following to Training Plan

Room	Equipment	
Navigation training room	Fishing and Navigation training unit	Fish-finder, GPS, Radar, etc.
Fishing machinery training room	Hydraulic fishing machinery training unit	Line hauler, purse winch, fishing gear
Engine training room	Marine engine training unit	Diesel engine, BHP- and torque-meter, etc.

Due to the need to allocate a period of two to three months annually for survey activities and to prepare the training program, the FTDC curriculum will be implemented for 10 months in 2002 and 9 months from 2003 to 2004. The number of training days per year will range from 236 to 245 days.

Each training course will accommodate 40 to 60 students and each class will consist of 30 students. The classes will be divided into morning and afternoon theory/ practice sessions so that the training rooms will be capable of accommodating all 30 students.

Consequently, each training room will be utilized 92 to 140 training hours per year (75 minutes/1 class: 115-175h) and about 30 percent of the 1100 class hours will be conducted in the training rooms. The operational ratio of the facility is appropriate when compared to the 110 to 170 class hours per year (50 minutes/1 class: 91-141h) which is allocated for the fishing and engine training courses of Japanese fishery high schools. In addition, if the existing workshop sessions are included, about 40 percent of the curriculum is comprised of practical training sessions. A list of the study hours required to complete a course held at each facility according to the training program is given in Appendix 6.2.3. In addition to the training program, there is a plan to lease

the facility to neighboring universities, which is also anticipated to raise the operational ratio of the training rooms.

Two training courses will overlap for one term in 2002 and 2003, but one course will mainly be held in the nearby fishing villages (Pekalogan, Pachi). The use of the training rooms will be adjusted in order to enable each course access to the training rooms.

2) Lecture room

Lectures other than training sessions will be conducted in the lecture room and existing seminar room. Like the training room, the lecture room will accommodate 60 trainees and the lectures will be divided into morning and afternoon sessions. This requires a lecture room that can accommodate a minimum of 30 people. It will be utilized for the retraining of trainers, small seminars, and the training sessions of the Fisheries Department of Semarang University. Therefore, there is a high demand for a lecture room capable of accommodating 30 people. The Semarang Maritime Academy, which is a similar facility, also has a lecture room capable of accommodating 30 people.

Whenever there is a need to accommodate more than 30 people for seminars and orientations, the seminar room at the existing main building (seating capacity of 100) will be used.

3) Instructors' room

The requested instructors' rooms will be used to accommodate guest lecturers for the training sessions. One room will be for one foreign lecturer and the other room will be shared by two guest lecturers from the DGF in Jakarta. When the latter room is vacant, it will be used to prepare teaching materials (editing, bookbinding, etc.).

4) Library

A provisional library of about 110m^2 is located on the first floor of the existing crew building and it houses the book collection, is used as an office for staff members,

and as a reading-room. This building was originally planned as an office for the Sub-section of Nautical and Vessel Maintenance (6 people) and crew (64 people). However, due to the lack of storage space for publications (about 3,000 books) at the former FTDC, the high demand by fisheries students from other institutions, as well as the need for storage space for future teaching materials, the crew building has been used as the provisional library. As a result, the staff and crew have been forced to utilize a moored boat as an office, which is inconvenient for administrative and communications activities, pointing the necessity for a separate library.

5) Laboratory

The former FDTC had a laboratory and the survey activities of the survey and exploration section collected basic samples of plankton and conducted water quality tests (salinity concentration, DO, etc.) using the survey vessel. Presently, the survey and exploration section works in a general office in the existing crew building. Although laboratory equipment and reagents are kept in a cabinet, the lack of laboratory tables and sinks has stymied survey activities and there is a need for a laboratory to conduct survey activities.

However, since the laboratory is not directly related to the training function of the center, it will be excluded from this Project. The existing facility will be renovated (installation of a laboratory table with a sink, etc.) to enable water quality tests to be implemented as part of a self-help plan.

6) Dining room, kitchen

Presently, the FTDC does not have a dining room or kitchen facilities and the majority of the staff members and trainees bring lunches or prepare instant foods at the hot water supply room. Although there are food stalls in the neighborhood, they are not utilized due to the unhygienic conditions.

A dining room and kitchen are needed to prepare lunches for part of the staff members and about 60 trainees, since the number of trainees is anticipated to increase during the training period with the introduction of morning and afternoon classes.

7) First-aid room

Presently, staff members working in the workshop keep basic first-aid supplies at the office in the event of injuries. First-aid is carried out by the medical staff of the Sub-section of Nautical and Vessel Maintenance. More than 500 trainees are expected annually when the training curriculum is implemented. In preparation against injuries and other emergency measures and to protect the safety of the trainees who will be working with machinery and tools, there is a need to provide a first aid room that can hold one bed.

(3) Jetty

1) Anchorage site for existing vessels

The FTDC owns 8 boats of which 2 are jointly operated throughout the year with private parties (Table 17). Presently, 4 FTDC boats are moored at the wharf in front of the previous FTDC facility and 1 small vessel is anchored at the jetty on the waterway in front of the site. The jetty in front of the Project site is a concrete structure, 40m in length that was built by the Indonesian government in 1999. The water depth at this site is about 1.0m to 1.5m and due to the shallow depth, the four boats that have a deep draft are unable to anchor at this site.

Table 17 Existing FTDC Vessels and Anchorage Site

	Name of Vessel	Tonnage	Draft	Anchorage Site
1	Tengiri	303	3.4m	Previous FTDC Wharf
2	Bawal Putih I	192	2.75m	Previous FTDC Wharf
3	Mutiara 4	115	2.23m	Previous FTDC Wharf
4	Lobster	84	Approx. 2m	Previous FTDC Wharf
5	Bawal Putih II	375	3.4m	(J.V. Operation)
6	Albakoa	86	Approx. 2m	(J.V. Operation)
7	KI. Sopek	6	Approx. 0.6m	(Kendar for Survey)
8	KI. BPPI 05	6	Approx. 0.6m	FTDC Jetty

(Future Anchorage Site)

According to information gathered from interviews at the FTDC and the Port Authority, the usage period of the present anchorage and candidate sites for the new anchorage facility was confirmed.

a. The usage of the wharf in front of the previous FTDC will expire at the end of December, 2000.
b. The Port Authority has granted the FTDC two anchorage sites for its boats as requested:

Anchorage site 1: Old jetty located within the port about 500m from the present wharf.
This anchorage site is far from the FTDC and thus inconvenient. Therefore, the FTDC intends to use it as a temporary anchorage site for vessels with a deep draft.

Anchorage site 2: Anchorage at the jetty on the waterway facing the FTDC
However, the water depth around the jetty is 1.0m to 1.5m, so the FTDC must carry out the dredging using its own resources. The canal in front of the FTDC is located downstream of a river and in order to maintain an adequate water depth, dredging must be carried out periodically for a couple of years. A depth of 3m was dredged in 1995 and therefore, there are no plans to implement any dredging in the near future. Adequate dredging has not been carried out, because the front of the existing jetty contacts the end of the waterway.

2) Extension of the existing jetty

As mentioned earlier, the FTDC possesses 8 vessels and it has prepared the following operations plan:

a. The two fishery resource survey boats (Bawal Putih II, Albacore) are jointly operated with a private company to survey marine resources and this arrangement will continue.
b. The Tengiri is 25 years old and will be scrapped due to high maintenance and repair costs.

c. The two vessels (Bawal Putih I, Mutiara) are under the management of the BPPL and will be transferred to Jakarta.

Consequently, the vessels that will utilize the jetty in front of the FTDC are the wooden vessel with shallow draft (Lobster, length 20m), the two small boats (KI. BPPI 05: length 6m and KI. Sopek: length 6m), and the requested, small, multipurpose training vessel (length 16m).

The Port Authority has allocated two anchorage sites for the FTDC vessels. In view of the size of the vessels which will be anchored at the jetty (length 40m) in front of the FTDC, if the mooring method is adjusted, the anchorage site will accommodate the vessels. Therefore, the request to extend the jetty has been excluded from the Project since it was concluded that the need was low.

3) Optimizing the existing jetty

Shock absorbent measures have not been taken with the existing jetty and consequently, there is a tendency for both the boat and the jetty to be damaged considerably during mooing, thus lowering durability. A buffer or shock absorber such as old tires, rubber fenders, etc. should be installed in the mooring area of the jetty requested by the Indonesian side.

Depth measurement findings show that the area in front of the jetty is relatively narrow, making it easy for construction machinery brought in overland to perform the dredging. Compared to dredging over water, this method is less expensive. As the water channel in front of the jetty is downstream of the river flow, accumulation of silt during the rainy season is certain; thus periodic dredging is required.

The costs of dredging and installing shock absorbers, aimed at the optimization of the existing jetty, can be considered as feasible for the Indonesian government to cover. In addition, since periodic dredging operations are necessary for further maintenance activities, the Indonesian side is supposed to cover the costs for these works.

2-2-4 Equipment Plan

The three basic themes of the FTDC education and training program are responsible fishing, fishing technique, and nautical knowledge. The training plan that was formulated on these three basic themes will require the following equipment.

(1) Fishing and navigation training unit
(2) Fishing machinery training unit
(3) Marine engine training unit
(4) Lecture equipment
(5) Workshop equipment
(6) Multipurpose small-scale training vessel
(7) Trainee bus

A summary of the correlation between the training plan and the training equipment that will be provided in the Project plan is shown in Fig. 5.

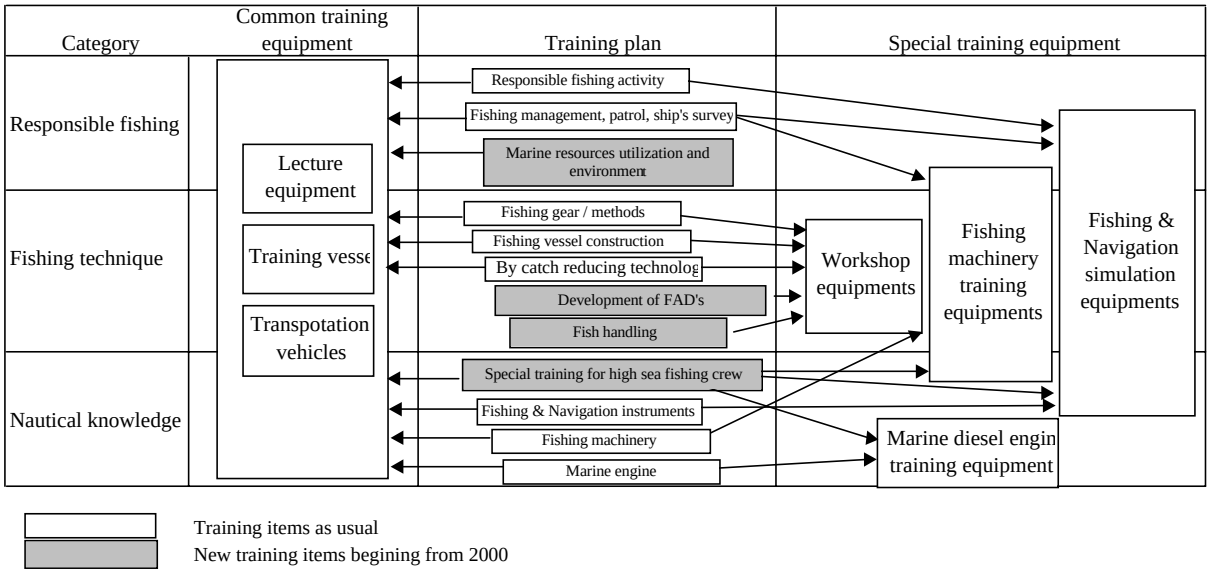


Fig.5 Correlation between the Training Plan and Training Equipment

(Improved training effectiveness due to combined land and sea training)

The current Project aims at holding training programs at the center, using simulators and other equipment, and another program onboard the training vessel.

Although training courses implemented at the center are inexpensive and safe, the training is fragmentary and it is difficult to provide practical experience. Training sessions on board the training vessel provide comprehensive experience in vessel operations, but it can be

dangerous and expensive in terms of cost and staff members. The advantages and disadvantages are shown in Table 18.

Table 18 Advantages/Disadvantages of Shore and Sea Training

	Advantages	Disadvantages
Shore training Using simulation training unit	Safety Available to many trainees Low training costs Possible to simulate dangerous training such as a ship's collision	Fragmentary training Less practical Not practical
Sea training Using training vessel	Practical training Available overall training	Dangerous Limited to number of trainees High training costs

Many fishery training institutions have adopted the practice of carrying out training courses on land first to ensure that trainees gain full comprehension of the training content; and on board training sessions are implemented in the final stages of the course which is more efficient in terms of time and economy.

Hence the basic underlying concept of the equipment plan formulated under this Project is to integrate the equipment which will be used on land and at sea, i.e. the equipment which will be installed on board the training vessel, in order to raise the educational and training impact of the course. This is shown in Fig. 6.

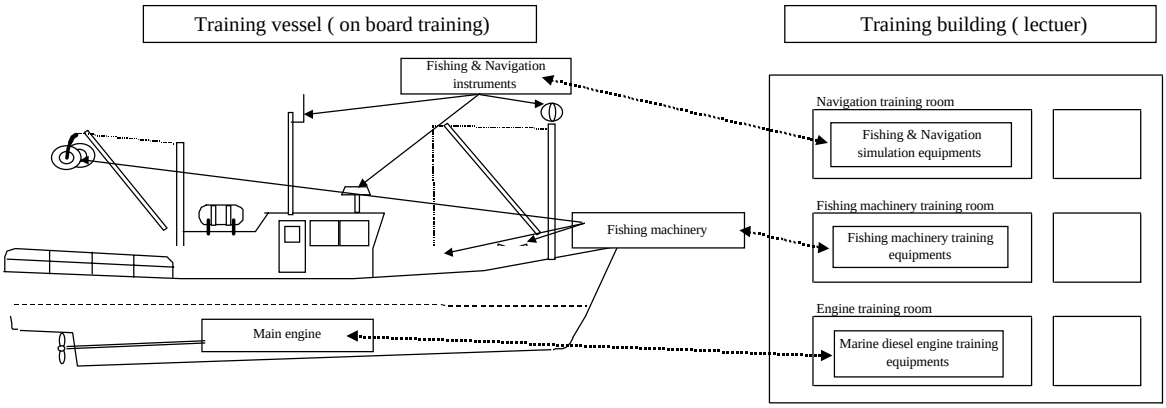


Fig.6 Integrated On-Land and On -Board Training Equipment

The following equipment for each field has been planned according to the basic concept shown above.

(1) Fishing and Navigation Training Unit

1) Fish finder training unit (1 unit)

The fish finder emits sound waves straight down into the water from a transducer that is attached to the ship's bottom; the schools of fish are detected when the reflected sound waves are imaged. This is one of the most important fishing instruments that are used in searching for fish. Since it plays a major role in modernized fishing, there is a high need for the fish finder as a training instrument. Presently, it is used by medium purse seiners, trawlers, and long liners in Indonesia.

The training course will provide instruction on its operation and daily maintenance. In order to raise the impact of the course, a recording device will be added to enable the images to be recorded on board the training vessel and to determine the condition of fish schools and whether fishing is suitable or not. In addition, a 10-inch display will be provided for use on board the training vessel.

2) GPS training unit (1 unit)

The GPS is a device that accurately pinpoints the location of a vessel and it plays a major role in raising the efficiency of the fishing operations and promoting safe navigation. There is a high need for the GPS as a training instrument and its use is rapidly becoming widespread in recent years.

A GPS unit with a monitor will be provided in order to enable trainees to prepare a navigation plan and to learn how to record data on fishing grounds. In addition, as in the case of the fish finder, a unit with a recording device will be selected to enable data to be recorded on the training vessel to increase the effectiveness of the training course.

3) Radar training unit (1 unit)

The radar is an instrument that emits high frequency radio waves, used to grasp the topography of the coast and to ascertain the presence of other vessels. It is particularly important in ensuring safe navigation during low visibility and there is a

high need to include the radar as a training instrument. Presently, it is mandatory for a ship's officer to undergo training in radar simulation according to international agreements and it is equally important for the fishing crew on navigation watch to be proficient in its operation.

The FTDC does not aim at fostering fishing boat officers. Therefore, a high-grade radar simulator with full specifications that meet IMO standards will not be provided; instead, a basic grade simulator that will provide steering simulation will be selected.

The unit will be comprised of one trainer's table and one trainee's cubicle. The trainer's cubicle will control the simulation program and the radar monitor and easy steering device will be placed on the trainee's cubicle. The display monitor will be 15 inches and will be shared by five to six trainees with an easy ARPA to enable trainees to practice radar plotting.

In addition, an antenna will be installed on the roof of the main building to enable comparative images of actual vessel movements in Semarang.

4) Weather FAX training unit (1 unit)

The weather FAX is a device which will receive information sent by each regional meteorological observation center such as weather and wave maps, data on typhoons, etc. Information on weather and ocean conditions is essential for safe fishing operations. Therefore, there is a high need to include the weather FAX not only as a training instrument, but as an important item in the operation of the FTDC vessels.

A compact 8-inch weather FAX receiver which can be used on board the limited confines of a fishing boat will be selected.

5) GMDSS training unit (1 set)

The GMDSS is an internationally established wireless communication system that was established to improve the safety of navigation and to prevent distress and accidents at sea. The major difference between this system and the traditional communication system is that the latter was dependent on manually transmitted Morse Code and the former is an automatic communications system that utilizes satellite

communications and digital selective call (DSC). This system guarantees that information regarding distress and safety is transmitted. The SOLAS rule which pertains to the GMDSS has been adopted in Indonesia and presently, ships with a total tonnage of more than 300 tons must be equipped with this system. In future, small fishing vessels will gradually be required to adopt this system as well. Therefore, there is a high need to include the GMDSS training unit in order to promote the dissemination of the GMDSS system.

The training set will be comprised of four units as shown in Fig. 7 - one unit for the trainer cubicle and three units for three training cubicles, in order to simulate communication between the trainer to trainees, and between trainee to trainer. Further, in order to provide a simulation of the GMDSS and the communication device, the communication unit (MF/HF, VHF transmitter/receiver, Inmarsat C, EGC, NAVTEX, etc.) which is installed in large fishing vessels will be selected for the trainer cubicle and a communication unit (VHF transmitter/receiver) which is commonly used on small fishing boats will be placed in the trainees cubicle.

Further, in order to raise the efficiency of the training, a wireless antenna will be installed on the roof of the building to enable communication between the center and FTDC vessels as well as indoor simulation.

The capacity of the main wireless device (MF/HF) will be the required minimum 150W.

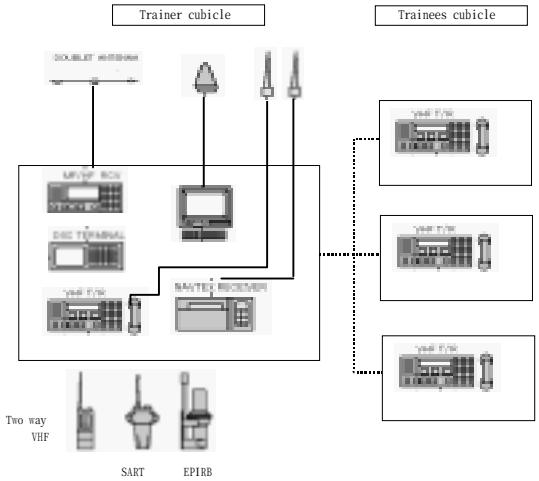


Fig.7 Diagram of the GMDSS Training Unit

(2) Fishing Machinery Training Unit

Fishing machinery such as the purse winch and line hauler are vital pieces of equipment for modernized, efficient fishing operations and therefore, they are highly needed as training equipment.

The aim of the equipment is to provide training in the mechanism of hydraulic fishing machinery, the structure of the device, and the operation and maintenance of each machinery. Purse seine, long line, and gill net fishing are popular in Indonesia. Therefore, the Project will provide the following six items of equipment.

(Machinery)	(Quantity)	(Type of Fishing)
1) Hydraulic purse winch	1 set	Purse seine
2) Electric power block	1 set	- ditto -
3) Hydraulic line / net hauler	1 set	Bottom long line, gill net
4) Hydraulic main drum	1 set	Long line for tuna
5) Branch reel	1 set	- ditto -
6) Hydraulic pump unit	1 set	Power source for above mentioned machine

Items 1, 3, 4, and 6 (hydraulic pump unit) listed above will be connected by a parallel circuit and a hydraulic pipe with a control stand installed in the middle. In order to promote easy understanding of the workings of a hydraulic system and its integration with each equipment item, the hydraulic pipe will be kept exposed on the floor of the training room.

Item 2, the electric power block, will be installed in the fishing gear repair area of the existing FTDC facility and a motorized unit will be provided for training purposes and to repair and develop new fishing gear.

The materials listed below will be provided by the Project for use in the training course on fishing gear development.

1) Materials for purse seine net (sardine)	1 set
2) Materials for tuna long line	1 set
3) Materials for gill net	1 set
4) Materials for hand line	1 set
5) Various types of artificial bait	1 set
6) Various types of fish trap models (10 types)	1 set
7) Materials for model fishing gear	1 set

The FTDC has expressed great interest in the fishing gear used in the fisheries industry of industrialized countries such as Japan and would like to introduce Japanese fishing gear technology in Indonesia. In response to this request, materials to produce one set of standard fishing gear used by small fishing boats in Japan will be included in the Project.

(3) Marine Engine Training Unit

1) Marine engine training unit (1 set)

The marine engine training unit is a device which simulates the conditions of the main engine on the sea and it is comprised of a diesel engine and a dynamo meter that adjusts the load on the engine. It is a vital training item used to instruct trainees in the operation, management, overhaul, and other maintenance procedures on land and there is a high need for the equipment.

The following marine engine training unit and related instruments are planned under the Project.

a. Diesel engine	4 cylinder, approx. 80 HP	1 unit
Hydro meter, cooling tower (included with the diesel engine)		
b. Engine cut model	4 cylinder, approx. 80 HP	1 unit
c. BHP torque meter		1 unit

The diesel engine will be a 4-cylinder diesel engine that is popularly used in Indonesia with about 80 horsepower and non turbo-charger engine. Further, in order to improve the training effect, the same series as the engine used in the training vessel will be selected and the training on land and at sea will be integrated.

The engine cut model will also be the same type as the training vessel to promote better understanding the internal parts of the engine.

The BHP torque meter will also be used in the FTDC boat-building project in addition to the engine training course, in order to show the characteristics of the long-tail engine and others that are used as outboard engines by small-scale fishermen in Indonesia.

2) Outboard engine (1unit)

The outboard engine will be used to complement the engine training course and instruction on its operation, daily maintenance, and the over hauling of the engine will be given. It will also be used to power the boat used by trainers for training seminars conducted at local fishing bases and fishing villages. Therefore, a gasoline driven 50HP engine for use at sea with spare parts that can be purchased locally will be provided.

(4) Lecture Equipment

The following five items will be provided as lecture equipment.

1)	OHP, screen	1 unit
2)	Slide projector	1 unit
3)	TV monitor, video	1 unit
4)	Computer, printer	1 unit

(OHP, Slide projector)

The OHP and slide projector are essential items of equipment for use in classroom lectures and in seminars. Therefore, the need for both items of equipment is high.

Videos and slides of past survey and exploration activities of the FTDC were prepared and used in classroom instruction. The existing OHP at the center was purchased more than ten years ago and is presently out of order due to depreciation.

One mobile OHP and slide unit which can be used in different classrooms will be provided.

(Personal computer, printer)

The personal computer and printer are essential for preparing training materials (text) and analyzing survey data.

The FTDC presently has a total of six computers, of which three have been allocated to the management and accounting sections. The remaining three computers have been designated for the survey and exploration, fishing gear, and environmental resource conservation sections. Since there is only one computer for each section, the computer operators are fully occupied handling the work for that section alone.

As a result, there is no computer for the professional staff and preparation of the curriculum and syllabus, as well as text development for the training course are handwritten by the trainers and given to the computer operator. This is an extremely inefficient and poor working system.

When the center begins its full-time operations, this system is anticipated to hinder training activities. Hence it has been concluded that there is a high need for a computer.

Therefore, a minimum of one computer for preparing teaching materials will be provided and the Indonesian side will be responsible for providing any remaining equipment needed.

A desktop computer that will be provided by the Project which will be capable of carrying out word processing, spread sheets, database, and graphics. Other related hardware items that will be included with the computer are a backup UPS and an inkjet printer (A4 size).

(5) Workshop Equipment

The trainers of the FTDC workshops are highly experienced professionals in the fields of marine engines, fishing gear, and fishing techniques. The equipment for the workshop include items that will be directly utilized in engine-related training courses, production of fishing gear, FTDC boat engine repair, fishing devices, production of fixtures, etc. that are major activities which support the center; and the need for such equipment is high. The aim and use of the major equipment items for the workshop are given below.

- Engineer training (welding, overhauling the engine) and preparatory training
- Fishing gear arrangement, FAD's, production of by catch reducing device
- Repair of ship hull, engine, fishing devices of FTDC boats
- Production of fishing machinery, marine fixtures
- Construction of prototype fishing boats
- Maintenance and repair of ship bottoms

All workshop equipment items have been divided into the following eight categories needed to carry out the activities listed above.

1) Various welding equipment (electric, gas, aluminum)

Welding equipment is used in engine training sessions, in addition to ship repair and fishing gear production. Hence, one unit each of an electric, oxygen acetylene gas, and aluminum welding will be provided.

2) Metal processor (lathe, metal cutter, grinder, hydraulic press)

In addition to engine training sessions, the lathe is also used in making the winch shaft. Therefore, a lathe with a cutting length of 800mm will be provided. The metal cutter, grinder, hydraulic press, etc. that are ordinarily used in metal processing will be provided.

3) Air tools

The air tools are an air impact wrench and a compressor which are used for engine maintenance such as over hauling. The output of the compressor will be 3.7kw, in view of the volume of blow air required.

4) Wood work tools (wood cutter, table planer, etc.)

The wood work tools are mainly used for producing fixtures and building boats. The table plane will be installed in the workshop and the other tools will be portable tools.

5) Heavy transport equipment (hand forklift, hydraulic arm jack)

The heavy transport equipment are used to transport heavy objects such as engines and winches that have been removed from the ships for repair at the workshop. Both items will be manual, hydraulically operated types of equipment that do not require electric power, so that they can be used in areas where there is no electricity. Additionally, they will have a capacity of more than 1 ton since they will be transporting heavy engines.

6) Hand tools

The following hand tools that are needed in engine maintenance and repair will be provided.

Driver set, Deep socket wrench, Small socket wrench, Hexagonal wrench, T-wrench, Handle adapter

JIS standard tools will be provided for guaranteed precision and durability.

7) Measuring instruments (nozzle tester, mega tester, clamp meter, etc.)

A nozzle tester with a capacity 500gf/cm will be provided. In addition, JIS standard electric measuring tools such as tester, mega tester, clamp tester will be provided for guaranteed precision.

8) Diving equipment

The diving equipment will be used in diving sessions as well as in the task of repairing the propellers of the FTDC vessels, coral reef studies, etc. The existing equipment was purchased ten years ago and many are damaged and in disrepair. As a result, the following equipment will be provided.

Diving compressor	approx. 4HP	1 unit
Diving regulator		1 unit
Diving air tank	14L	1 unit

The diving compressor will be engine-driven which will enable it to be used in field work, the capacity will be about 4HP which will fill standard 14L air tanks in 30 minutes.

The following equipment will not be provided since they are not needed in supplementing the existing five air tanks of the FTDC and since they are potentially dangerous to handle.

Air tanks for storage 12gal

Air tank filling line

(6) Multipurpose Small Scale Training Vessel

There is an appropriate and high need for a multipurpose small scale training vessel. It is an essential item in implementing this Project since it will share the objectives and functions of the existing FTDC vessels. Further, the management and maintenance cost of the vessel is easy to procure from fish sales generated from the fish catch harvested during the training activities. As a result, one small, multipurpose training vessel/purse seiner will be provided.

The vessel's use, the division of functions with existing vessels, and the specifications of the training vessel are explained below.

1) Objective

The following three training activities are planned using the FTDC training vessel and the content is closely integrated with the center's overall training curriculum.

<Main Purpose of the Training Vessel>		<FTDC Training Curriculum>
i. Extension activities at local fishing villages	→	Promote responsible fishing
ii. Develop new fishing gear, trial operation	→	Develop fishing technology
iii. Implement fishery training	→	Foster fishing technicians

The FTDC plans to operate a total of 200 days per year based on its training curriculum. The details of this plan are under preparation by the technical staff of the center, but the proposed plan which was obtained during the field survey is given in Appendix 6.1.1.

2) Examination to use existing vessels

The FTDC currently manages the eight vessels, these existing six are not able to conduct field training sessions. An outline of the existing six vessels is that one vessl (Tengiri) is old and no operating, two vessels (Bawal Putih II, Albakora) are JV operating, two vessels (Mutiara 4, Bawal Putih I) are owed by BPPL, and one (KI Sopek) is based in the nearby fishing base of Kendal and monitors small-scale fisheries activities throughout the year and conducts fish catch surveys.

Based on the above circumstances, there are only two vessels, the KI BPPI and the Lobster which utilizes the FTDC as a base. The former is a small boat and like the KI SOPEK, it is not equipped with navigational instruments and fishing machinery, which makes it unsuitable as a training vessel. The latter boat is equipped with tuna long line equipment, but because it was poorly designed at the time it was constructed, its stability is conspicuously inferior and it is no longer in use.

Therefore, all existing vessels are not available to use as training vessel for on-board training.

3) Specifications of the training vessel

The specifications of the training vessel are based on four basic concepts namely, 1) safety, 2) efficiency, 3) economy, and 4) effectiveness. In other words, the vessel should be 1) safe in carrying out fishing and survey training activities, 2) can be efficiently navigated, 3) the operation, management and maintenance costs should be economically viable, and 4) it should contribute to the objectives of PROTEKAN 2003 and implement adequate training activities.

The specifications of the training vessel are as follows.

a. Type of training vessel

Based on discussions with the Indonesian side, a sardine purse seiner rather than the originally requested tuna long liner will be provided for the reasons explained below.

(Economic operation)

The major tuna fishing grounds are located in the center of the Indian Ocean and in order for a tuna long liner to reach these grounds it must travel a major circuitous route around Java island from the Java Sea fronting Semarnag. This navigation route is economically unviable for training purposes. In contrast, purse seine fishing in the pelagic fishing grounds for sardine and mackerel on the Central Java coast where the FTDC is located is popular. Therefore, navigating the distance to these fishing grounds by a sardine purse seiner is economically viable.

(Potential of Targeted Fishery Resources)

The target catch of the training vessel are sardines, mackerel. The potential of pelagic fish resources such as sardines and mackerel is high and further development is possible (Developed Potential: 40%).

b. Vessel hull materials

The materials of the small fishing boat that has been proposed under the Project will be constructed of wood, FRP, or aluminum light alloy. The merits and demerits of these materials are shown in Table 19.

Table 19 Merits and Demerits of Hull Materials

Boat Material	Merits	Demerits	Remarks
Wood	Lightweight body; economically viable	Prone to insect damage; low durability	Commonly used material of small-scale fishing boats; 7-8 years durability
FRP	Lightweight body; economically viable; high durability	Minimal freedom in designing the hull using a mold	FTDC has experience in building a FRP boat; durability of higher than 15 years
Aluminum light alloy	High durability	Expensive; special welding technology needed to repair the boat	Difficult to repair in Semarang; durability of higher than 15 years

The fishing boats of local fishermen are mainly wooden vessels which are prone to insect damage and have low durability. Although the aluminum light alloy boats have the highest durability, they are expensive and special welding technology which is not available in Semarang is needed for boat repairs. In contrast, a FRP boat is lightweight, economically viable in terms of navigation, and the FTDC is capable of carrying out boat repairs. It is the most advantageous of the three types of boats.

Therefore, based on the above, an FRP boat will be selected for the Project.

c. Size of the training vessel

The size of the boat is restricted to the type of mold that is used to construct the vessel. Based on a review of the minimum size required for an effective purse seiner training vessel, the types of molds used by major ship builder, and a length of either

14m or 16m, it was decided that the length of the training vessel would be 16 meters for the reasons shown in Table 20.

Table 20 Comparison of the Training Vessel Size

	Item	14m type	16m type	Remarks
Main items	Length Width Depth International tonnage Main engine capacity Speed	14m 4m 1.4m 18 ton 210 H.P. 8 knot	16m 4.7m 1.8m 28 ton 280 H.P. 8 knot	
Safety factor	Draft Freeboard GM	1.13m 0.27m 1.24m	1.15m 0.55m 1.14 m	 0.5m is necessary for safety More than 1.0m gain enough stability

A comparison of the merits and demerits are given in Table 21.

Table 21 Evaluation of the Training Vessel Size

	14 meters	16 meters
Safety	△Unsafe Free board is only 0.27m and surplus buoyancy is lacking. Hence inadequately safe for purse seine fishing	◎ Safe Free board is 0.5m and safe. Adequately safe for purse seine fishing.
Training Efficiency	△Small cabin capacity Due to limited deck space, the number of trainees is limited to 10. One long-term training course will have 50-60 trainees and difficult to secure adequate training hours.	○ Necessary minimum cabin capacity is procured. Due to adequate deck space, 15 trainees can be accommodated. Training course with 60 trainees can be accommodated in 4 training sessions per day.
Maintenance Cost	○ No inspection cost Annual inspections are not required	△Annual inspection costs (But, can be disbursed by FTDC) Annual inspections are required. Annual inspection fees are 2,000,000 Rp (about 30,000 yen)
	○ Membership in Indonesia's Boat Cooperative (BKI) not mandatory	X Membership in BKI mandatory for first year BKI membership fee is 15,000,000 to 20,000,000 Rp (about 400,000 yen) (for only the initial joining fee)
Convenience	○ Use of jetty in front of center; front water depth is 1.5m (before dredging) Draft: 1.13m	○ Use of jetty in front of center; front water depth is 1.5m (before dredging) Draft: 1.15m

Although the 14m boat has a slight advantage in terms of maintenance cost, its effectiveness as a training vessel is inferior due to the poor safety factor.

In the past, the FTDC designed a training boat which neglected the navigational safety factor and consequently, it was unable to utilize the boat effectively. Therefore, the safety factor should be a priority.

Based on a study of all of these combined factors, it was concluded that the minimum required size of the training boat under this Project would be 16 meters in length.

d. Cruising distance

As mentioned earlier, the three major activities of the training vessel are:

i. Extension activities at local fishing villages
ii. Development and trial operation of new fishing gear
iii. Implementation of training activities

Activities ii and iii are basically one-day trips, but activity i, extension activities at local fishing villages, entail the maximum traveling distance. The maximum traveling distance has been set at about 900 nautical miles, using the fishing village on the north side of Sulawesi island as the most distant destination.

e. Capacity of the fuel tank

The capacity of the fuel tank will be 7kl based on the maximum cruising distance.

f. Capacity of the fish hold

Based on a review of the fish catch volume of local fishing boats of the same size, a fish hold with a total capacity of $10m^3$ (fish hold $5m^3$ + ice hold $5m^3$) is required. Additionally, in order to maintain the freshness of the fish catch, an ice hold is needed. Therefore, based on the FAO recommendation, the capacity of the ice hold will be $5m^3$, equivalent to the capacity of the fish hold.

g. Cruising speed

The cruising speed of the training vessel will be 8 knots based on such factors as the cruising speed of local fishing boats of equivalent size, navigation efficiency, reduced fuel costs, and purse seine fishing.

h. Complement

The activity which requires the most manual labor is purse seine fishing operations . Local small-scale fishing boats using traditional fishing methods employ 20 to 30 crewmen. However, the training vessel will be equipped with hydraulic fishing machinery and labor will be automated which will reduce the need for manual labor. Hence the maximum number of crew members for the training vessel will be 20.

In addition, the vessel will contain a minimum of six beds for long trips of more than one night.

4) Maintenance costs

Based on the conditions explained above, the annual maintenance costs have been calculated as shown in Table 22.

Table 22 Maintenance Costs of the Training Vessel

Unit: 1000Rp

Items		Amounts
Revenue	Fish production	261,900
Expenditure	Fuel oil	84,672
	Lubricating oil	14,112
	Spare parts	1,275
	Maintenance	11,050
	Fishing gear	21,000
	Fresh water	1,680
	Ice	4,500
	Medicine	1,600
	Foods	57,380
	Total	197,269
Balance		+64,631

Revenue generated from the sales of the fish catch harvested during the trial fishing operations is estimated to cover about 95 percent of the operating costs of the training vessel. The annual revenue and expenditures are estimated at 64,631,000 Rp.

The DGF is planning to alleviate the financial burden of the FTDC by transferring or scrapping three of the eight vessels managed by the FTDC by 2002. This measure is anticipated to curtail costs by 24,000,000 Rp annually. As a result, the total maintenance cost of the FTDC vessels, which includes the additional new training vessel, will be reduced.

A breakdown of the revenue and expenditures generated by the FTDC vessels is given in Appendix 6.1.3.

(7) Trainee's bus

The requested trainee's bus (seating capacity of 30) will be utilized for the following three purposes.

a. Shuttling trainees between the Project site and the city hotel

b. Shuttling trainees from transportation terminal (station, port) to the Project site

c. Transporting trainees to the field training site and outdoor lectures

It was concluded that the provision of one trainee's bus with a seating capacity of 30 people was appropriate under the Project, based on a review of factors such as the division of function between the requested bus and existing vehicles of the center, the purpose and role of the bus in the training program, its economic impact as an aid item, etc.

Details of the operation plan and maintenance cost of the traine's bus is given in Appendix 6.4.1.

(8) Equipment to be Provided By the Indonesian Side

It has been concluded that the following equipment can be provided by the Indonesian side through self-support measures due to the reasons given below.

1) Refrigeration training unit

The refrigeration training unit is comprised of a compressor, cooling hold, receiver, expansion valve, control board, etc. This unit is utilized in the operational training of the vessel. However, with the exception of a segment of the large fishing vessels in Indonesia, the refrigeration unit is widely used. In addition, training sessions on the operation of a refrigeration unit occupies only a small percentage of the FTDC curriculum. Therefore, it was concluded that a refrigeration training unit will be provided when there is a greater need for such a unit.

2) Underwater video camera set, underwater camera

The underwater video and camera set is needed to prepare instruction materials for the training activities and in coral and ocean survey activities. However, due to the severe environment in which the equipment is used and breakdowns due to water leakage, its durability is limited and therefore, it will not be provided under grant aid cooperation.

3) Copy machine

The copy machine is required for printing texts for trainees, guidance, and final term examinations. Under the training plan, instruction materials for a maximum of 60 students per class must be prepared and the need for a copy machine to prepare a large number of copies is high.

However, in addition to training activities, the copier will be used for general office use as well; therefore, it is not suited as a grant aid item in this Project. Therefore, it should be provided by the center.

The following items of equipment (Table 23) can be provided under the center's budget, due to its low cost and they are shown below. It is expected that the equipment can be procured by the center as part of its effort to become self-supporting.

Table 23 Equipment to be Provided By the Indonesian Side

Item	Specification	Q'ty
Tool for fishing gear	Spike, net needle etc.	1set
Air gun	175mm AG-6	1
ditto	1400mm H-77	1
Blow gun	Straight tube 460mm	1
Valve tools	230mm (handle)	1
Air hose	Inside 6mmÅ~20m Length	1
ditto	Inside 8.5mmÅ~20m Length	1
Plague for air hose	Connection 9	5
ditto	Connection 11.3	2
ditto	Connection 15	2
C-cramp	Opening 50mm 0.38kg	2
ditto	Opening 100mm 1.28kg	2
ditto	Opening 150mm 2.10kg	2
ditto	Opening 200mm 3.50kg	2
Rivetter tool kit	Contents Rivetter NSA4-2 100 NSA4-3 100, NSA5-2, NSA5-3 100	1
Protect glasses	Round type	5
Grove	Size-L	5
Glasses for welding	Ordinary type	3
Spray gun	Gravity, Straight shape	1
Timing light	Power Source DC 12V	1
Battery tester	Contents:Hydrometer, Thermometer, Syringe, Case size 360-143-62mm	1
Presser gage for diesel engine	0-70kgf/cm for Medium Case size 210-330-52mm	1
Torque wrench ditto	9.5mm Sq. 100-450 kgf/cm 12.7mm Sq. 400-2800kgf/cm	1 1
Tap and dies	28pcs-Medium-Tap/26-dies	1
	For 0.75/1/1.25/1.5//1.75/2/2.5/3mm	1
Chain block	1 ton/Lift 2.5m	1
Hand block	910-610 mm/Capacity-300kg	2
Clipper	Range 0-300mm/Min.0.05mm	1
Diving weight	Lead(1kg)× 6 pcs	1
Electric drill	Capacity ： steel 13mm wood 30mm	1
Handy plainer	Handy type Capacity: 80mm W /0～2mmD	1
Spark plague check kit	Air Pressure 8 lgf/cm 465-450-260mm Accessories: Adapter-3, Joint, Gauge Cleaning compound 1kg	1
Booster cable	100A 14/mm-2.5m	2
Engine cleaning gun	Cup-1L580mm940mg H-88	1
Battery tester	Power Source DC 12V 280-160-100mm	1
FAD's		1set
Drilling machine	Capacity 13mm	1

2-3 Basic Design

2-3-1 Design Concept

(1) Concept on Facility Design

1) Policy on natural conditions and surrounding environment

- Insulation, ventilation, and sunlight will be taken into consideration in the design of the facility due to the high temperature and humidity of the tropical marine climate.
- The facility design will be able to withstand maximum wind velocity, tides, and other conditions. In addition, the construction materials and equipment will be durable against salt damage and other natural conditions.
- In order to cope with the weak ground and settlement, a building structure with minimal settlement and maintenance costs will be studied.
- The height, color, and facade of the buildings will harmonize with the surrounding environment.
- The design and construction method with the least impact on the environment and surrounding coastal area will be selected.

2) Policy on construction conditions

Negotiations with the Ministry of Public Utilities, Ministry of Environment, and the Port Authority are required prior to constructing the facilities. There are laws and regulations pertaining to building structure and fire prevention measures; and although there is no foreseeable problem in abiding by local standards, adequate discussions and confirmation with the Ministry of Environment on environmental standards is especially important prior to the start of the construction work.

The standards of the local construction companies have been highly evaluated, but construction companies which consider such factors as the work schedule, quality and safety considerations are limited. In order to minimize the cost, it is important to clearly establish the grade. General labor will be procured locally, but the specialized work will require foreign supervision.

Most of the construction materials and equipment can be procured locally, but specialized machinery will have to be imported from neighboring countries.

Combined factors such as the use, durability, cost, etc. will be considered in the selection of construction materials; and materials that can be supplied locally will be used as much as possible. The inventory volume and delivery dates must be confirmed when the Project is implemented.

3) Policy on local contractors, equipment, and materials

Among the local contractors, there are general construction companies that own their own heavy equipment and companies that specialize in supplying labor. But the majority are branch offices of firms located in Jakarta and most of the companies with adequate technical capabilities are concentrated in Jakarta. The construction methods that utilize mainly local technology and equipment will be adopted.

4) Policy on the maintenance capabilities of the Project implementing institution

The scope and content of the facilities will adequately reflect the technical level of the staff members responsible for their operations and maintenance. The grade and specifications of the equipment will be selected according to their low maintenance cost (electricity consumption volume, frequent exchange of consumables, etc.).

5) Policy on construction works

The construction schedule will take the monsoon season from October to May into consideration. In addition, a provisional plan and work schedule, that can be adjusted to minimize any disruption to the activities conducted at the existing buildings, will be adopted.

The majority of the equipment and materials will be supplied locally or imported from Japan and their procurement will not affect the construction period. Hence the inventory volume of the materials must be checked constantly in order to prevent the occurrence of any shortage.

(2) Basic Concept Regarding Equipment Selection

- The land equipment (fishing and navigation training unit, fishing machinery training unit, marine engine training unit, etc.) will be integrated with the equipment that will be installed on board the training vessel (navigation instruments, hydraulic fishing device, main engine), in order to raise the effectiveness of the training course.
- The specifications of the lecture equipment will be capable of accommodating seminars with 60 trainees and the personal computer will be capable of producing the required amount of text material.
- The specifications of the workshop equipment will meet the purpose of the training session and will enable the FTDC vessels, facilities, and training equipment to be repaired by the center.
- The small multipurpose training vessel will be capable of navigating 900 nautical miles which is the distance to the farthest local fishing village targeted for extension activities by the center, in addition to one day training sessions in fishing.
- A vehicle with the minimum specifications capable of fulfilling its purpose will be selected.
- The minimum quantity of equipment that is needed to implement the project will be provided, but the required amount of easily damaged equipment or spare parts will also be provided.
- The grade of the equipment will be determined according to usage, durability (damage due to salt and climate), and easy handling.
- The equipment which can be repaired locally or with consumables or spare parts that can be purchased locally will be selected. Conversely, the equipment which cannot be easily exchanged or with spare parts that are difficult to obtain will be eliminated.

2-3-2 Basic Design

(1) Facilities Layout Plan

(Integration with Existing Facilities)

The Project site is located in the western section of the Tanjun Emas Port and it borders an access road that parallels the canal that runs north to south on its east side. The shape of the site is rectangular about 100m north to south and about 90m east to west, without the northwestern corner (about 30m x 30m). The three-storied main building is located in the center of the site and there is a parking lot and tennis court on its north side. An empty lot is located on the south side of the main building and the Project's facilities will be constructed in the southeastern corner of the site. The crew building is located on the west side of the main building and the fishing gear storage and workshop buildings are located on the west side. The Project facilities will be located on the south side of the main building and the east side of the workshop building.

An approach way has been secured on the east side, towards the front road, and the new facilities will be located in front of the road facing the workshop building. An empty area has been allocated on the north side of the new structure next to the main building with adequate width for lighting and ventilation. On the south side of the new building, adequate width will be allocated to enable construction work and water supply/drainage facilities to be installed and to provide lighting and ventilation for the rooms located on that side.

(Activity flow)

The main entrance will face the front road for a convenient approach by trainees. The sub-entrance will be located on the east side of the workshop building. A service entrance will be located for the kitchen on the main building side. The figure of activity flow is shown Fig. 8.

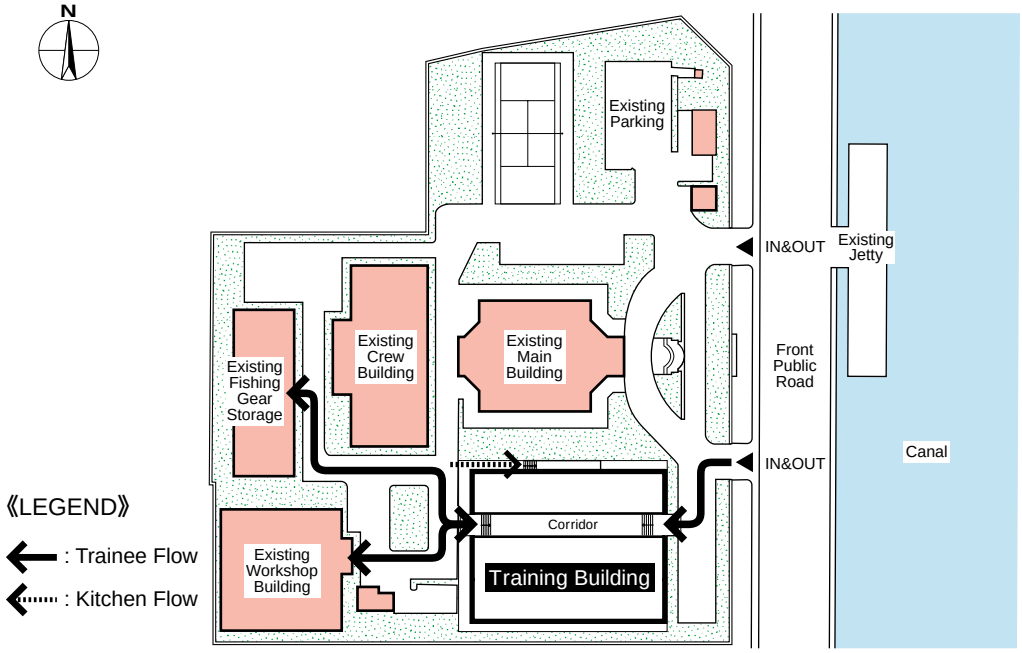


Fig.8 Activity Flow for the FTDC

(External planing)

An approach for vehicles will be located by extending the existing compound road next to the access road. A passage way will be located on the main building side, water supply and drainage will be installed to the southern boundary side. The existing green area will be preserved as much as possible.

(2) Architectural Plan (Training Building)

1) Floor plan

The training building will be a one-storied rectangular structure. A central corridor connecting the main entrance on the east side to the sub entrance on west side will be provided. The training rooms for navigation, fishing machinery, engine, lecture, etc. will be located on the south side of the corridor and the north side will contain the instructors' room, library, dining room/kitchen, and other rooms that support the training courses. The central corridor running east to west will accommodate the flow of movement as well as provide ventilation and light for the building. The corridor between the fishing machinery room and navigation training room will be planned to provide ventilation and light. The first aid room will be located next to the main entrance and the toilet and kitchenette will be located near the sub-entrance.

(Navigation Training Room)

Based on the size of training rooms at a similar facilities, such as the Semarang Maritime Academy, the rooms with a seating capacity of 30 trainees will be 7.2m x 14.4m (Fig. 9). The training rooms will be zoned according to function, i.e., lecture or training. In order to reduce the effect of the outdoor light, training sessions utilizing the fishing and navigation training unit will be held on the north corridor side. It will be a free-access floor and the fish finder, GPS, weather FAX, etc. will be set on the counter against the wall and the radar and the GMDSS training unit will be set up on the trainer and trainee tables. The window side on the south side will be used for lectures and three tables capable of accommodating 10 people each for use during lectures and the training sessions will be installed. The storage room at the side of the entrance will be used to store instruction texts, attachments, etc.

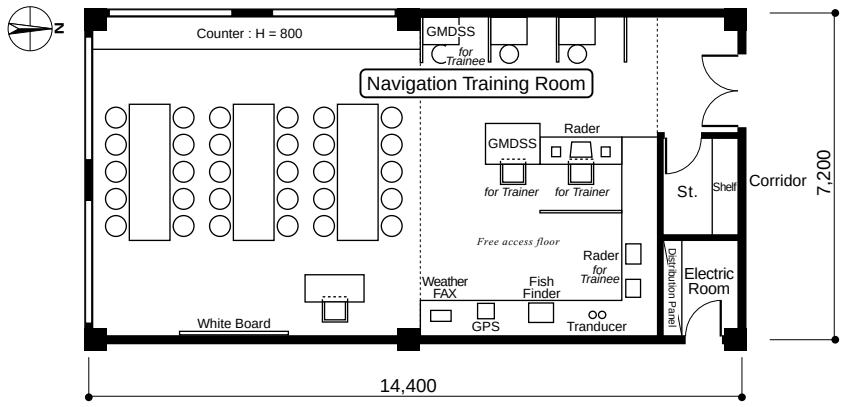


Fig.9 Floor Plan of the Navigation Training Room

(Fishing Machinery Training Room)

This training room will have a seating capacity of 30 trainees and it will be the same size as the navigation training room (Fig. 10). It will also be zoned according to function, i.e., lecture or training. Fishing machinery such as the purse winch, line hauler, main drum, etc. will be installed on the north corridor side. The lecture and training tables will be located by the south window side and they will be used during lectures and in fishing gear production activities. The various types of fishing traps will be displayed on the counter by the window and the lower end of the counter will

be used to store small tools. The storage room for fishing gear and nets will be located at the side of the entrance to the room.

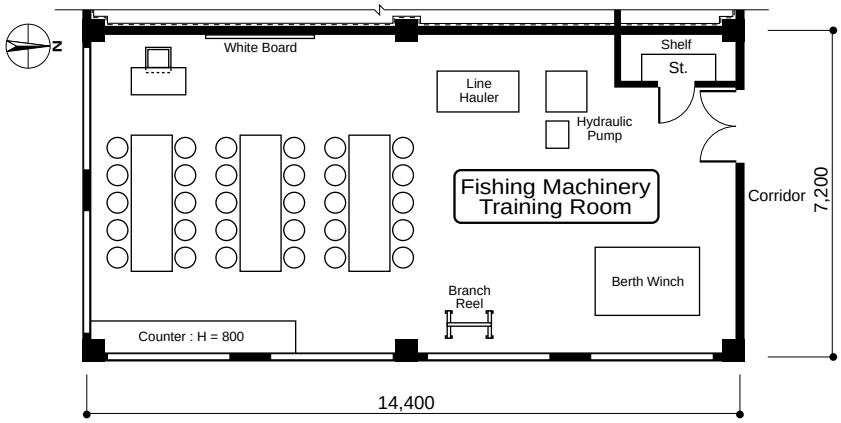


Fig.10 Floor Plan of the Fishing Machinery Training Room

(Engine Training Room)

Like the fishing machinery training room, the engine training room will have a seating capacity of 30 trainees and the size and zoning will be the same (Fig. 11). The marine engine training table, engine cut model, etc. of the marine engine will be located on the north corridor side. Three training tables will be placed on the south window side. An outboard engine will be placed on the side of the entrance and the counter by the window will be used for training and repair work. Small tools will be stored on the cabinet under the counter and the large tools will be kept in the storage room by the entrance.

Measures to shut out the noise generated by the marine engine will be taken and the room will be located on the west side adjacent to the fishing machinery training room where machinery noise is also generated.

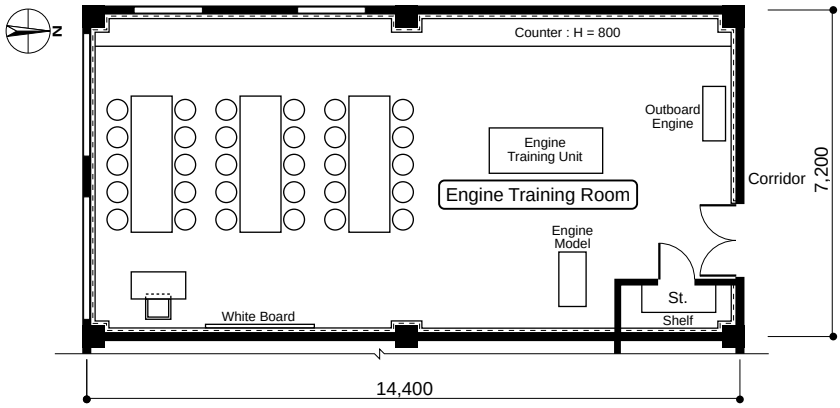


Fig.11 Floor Plan of the Engine Training Room

(Lecture Room)

Equivalent in size to the lecture room at the Semarang Maritime Academy, the lecture room will be 7.2m x 10.8m with a seating capacity of 30 trainees (Fig. 12). One trainer's desk, chair, and 30 sets of desks and chairs will be installed. Teaching and reference materials will be displayed on the counter by the south window side and cabinet will be provided under the counter. The room will be located adjacent to the relatively quiet navigation training room on the east side of the building bordering the front road.

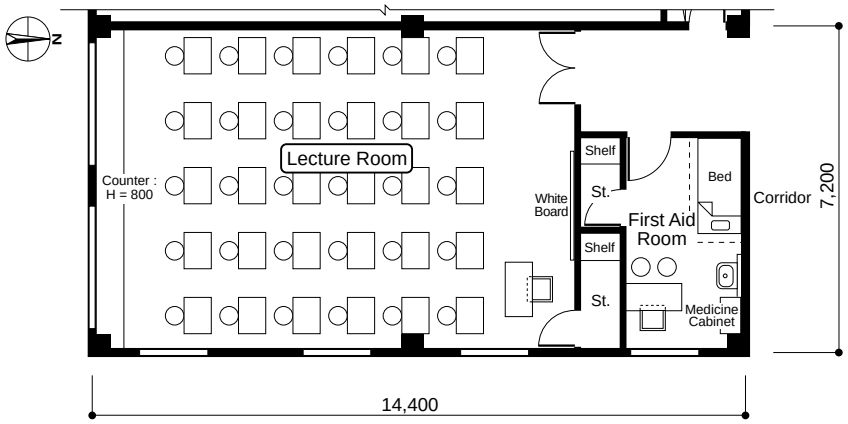


Fig.12 Floor Plan of the Lecture Room

(Instructor's Room)

The instructor's room will accommodate three persons and will be partitioned into two sections. One section will accommodate a desk and chair for one instructor and two chairs for interviewees. The other section will contain two sets of desks and chairs and a small work corner for preparing teaching materials and meetings. A cabinet counter will be installed by the window on each side. The total floor area will be 38m^2 (in accordance with "Architectural Design Data", Architectural Institute of Japan).

(Library)

Workspace for three librarians, a reading-room for 12 people, and space to accommodate a book collection of 3,000 will be allocated for information-gathering

purposes by trainees, staff members, and fisheries students from other institutions. The library will be located in the northwest corner adjacent to the main entrance. It will have a total floor area of 71m^2, of which 51m^2 will be allocated for the reading room and 19 m^2 for the book room.

(Dining Room, Kitchen)

The dining room and kitchen will be located on the north side of the central corridor. Its function will be to provide lunch for 60 trainees and part of the staff members and it will also serve as a multipurpose area for rest and discussions. The dining room will be self-service with a seating capacity of 30 (five tables that will seat 6 people) and trainees can be accommodated on three shifts. The kitchen will be of adequate size to cope with a 30-seat dining room and kitchen utensils will be arranged for efficiency. The entrance to the kitchen will be located off the existing outdoor service corridor on the side of the main building and the food storage and locker room will be located at the side of the entrance. The total floor area will be 84m^2, of which 51m^2 will be allocated for the dining room and 32m^2 for the kitchen (in accordance with "Architectural Design Data", Architectural Institute of Japan).

(First-Aid Room)

The first aid room will be responsible for dispensing emergency care in the event of illness or injury. A desk and chair for one first aid staff, a simple bed, medicine cabinet, and sink will be installed and the room will be located to the side of the main entrance. The total floor area will be 13m^2.

(Toilet, Cleaning Equipment Storage)

Two toilets, one urinal, and two basins will be installed in the men's toilet and one toilet, one basin, and one sink for cleaning will be installed in the women's toilet. The sink for cleaning will be installed in a storage for the cleaning equipment. Both toilets and a storage will be located next to the sub-entrance. The total floor area will be

23m^2,of which 13m^2 will be allocated for the men's toilet, 7m^2 for the women's toilet, and 3m^2 of storage for the cleaning equipment.

(Kitchenette)

The kitchenette will be located next to the instructor's room and it will contain a sink, a small range, and cupboard. The total floor area will be 3m^2.

(Electricity Room)

The electricity room will contain the switchboard. Electricity will be provided from the southeastern corner of the site, which is comparatively close to the room's location near the main entrance. The total floor area will be 4m^2.

(Storage Room)

The storage room will be located next to the instructor's room, facing the central corridor. The total floor area will be 6m^2.

2) Floor area plan of each room

The floor area of each room of the planned facilities is in accordance with "Architectural Design Data", Architectural Institute of Japan, and is based on local examples of similar institutions as shown in Table 24.

Table 24 Calculation Standard and Floor Area of Each Room

Room	Basis for calculation	Size of project
Navigation training room	・121.68㎡(7.8×15.6m) Training room size Maritime Academy Semarang ・Layout of training tables and counter for 30 trainees	99㎡ (includes 4㎡storage)
Fishing machinery Training room	・121.68㎡(7.8×15.6m) Training room size Maritime Academy Semarang ・Layout of training tables. fishing gear and counter	103㎡ (includes 4㎡storage)
Engine training room	・121.68㎡(7.8×15.6m) Training room size Maritime Academy Semarang ・Layout of training tables. Marine engine and counter.	103㎡ (includes 4㎡storage)
Lecture room	・81.12㎡(7.8×10.4m) Lecture room for 30 trainees Maritime Academy Semarang. ・Layout of desks and chairs for 30 trainees	80㎡ (includes 2㎡storage)
Instructor's room	・According to Architectural Design Data of Japan Director:18.0~25.0㎡/person Manager:13.0~18.0㎡/person Chief:6.5~8.5㎡/person	32㎡ Visiting instructor(1)13㎡ Instructors (2)19㎡
Library	・Layout of desks for 3 library staff. Reading tables for 12 people and 3200 books.	71㎡ Reading room 51.84㎡ Book storage 19.44㎡
Dining room / Kitchen	・According to Architectural Design Data of Japan Dining room / Cafeteria:1.2~1.4㎡/person Restaurant:1.5~1.8㎡/person Kitchen / 0.1~1.5㎡/seat	84㎡ Dining room:51㎡ (30seats1.7㎡/person) Kitchen/ Food storage / Locker room :32㎡(30seats1.08㎡/seat)
First aid room	・Layout of desks for first aid staff (1), bed, and sink.	13㎡ (includes 2 ㎡storage)
Toilet / Storage	・Layout of Men: Toilet(2) Urinal(2) Sink(2) Women: Toilet(1) Sink(1) Storage: Cleaning basin (1).	23㎡ Men:13㎡ Women: 7㎡ Storage:3㎡
Kitchenette	・Layout of sink, range, and cupboard	3㎡
Electrical room	・Layout of switch board.	4㎡
Storage	・Volume of existing material	6㎡

3) Furniture plan (installation work)

The installation works needed for furniture and other required fixtures for each room are shown in Table 25.

Table 25 Summary of the Furniture Plan

Room	Size of Furniture
Navigation training room	Counter:W=15.5m,D=0.6m,H=0.8m,(Low Cabinet:W=4.5m)
Storage	Shelf:W=2.0m,D=0.6m,×2
Fishing machinery training room	Counter:W=4.5m,D=0.6m,H=0.8m,(Low Cabinet:W=4.5m)
Storage	Shelf:W=3.5m,D=0.6m,×2
Engine training room	Counter:W=14.0m,D=0.6m,H=0.8m,(Low Cabinet:W=4.5m)
Storage	Shelf:W=3.5m,D=0.6m,×2
Lecture room	Counter:W=7.0m,D=0.6m,H=0.8m,(Low Cabinet:W=4.5m)
Storage	Shelf:W=1.0m,D=0.6m,×2
Instructor's room	Counter:W=7.0m,D=0.45m,H=0.8m,(Low Cabinet:W=5.4m)
Library	Counter:W=13.5m,D=0.45m,H=0.8m,(Low Cabinet:W=4.5m)
Dining room	Counter:W=3.0m,D=0.3m,H=0.1m,
Kitchen/Food storage	Shelf:W=5.0m,D=0.6m,×2
First aid room/storage	Shelf:W=1.0m,D=0.6m,×2
Kitchenette	Sink,Cupboard:W=1.5m,D=0.8,H=2.4m
Storage	Shelf:W=6.5m,D=0.6m,×2

4) Section plan

The first floor level of the structure has been based on the findings of the boring survey, the floor level of the existing building, etc. The ground floor level of the existing building has been raised 1.5m above the surface as a countermeasure against settlement. The section plan is shown in Fig. 13.

The first floor of the Project's facilities will be 1.5m above ground level as a countermeasure against settlement. The roof will be configured in a loose arch that is highly durable against the monsoon rains. Due to the high heat and humidity, the local buildings have high ceilings. The ceiling height of ordinary rooms such as the lecture room is about 3m, which is equivalent to the ceiling height of classrooms of similar institutions such as the Semarang Maritime Academy. The ceiling height of the existing workshop that uses machinery and tools is about 5m. Taking advantage of the sectional configuration, a portion of the ceiling of the training area of the marine engine training and fishing machinery rooms is set higher, at 5m. The ceiling height of the central corridor is 5m for adequate ventilation.

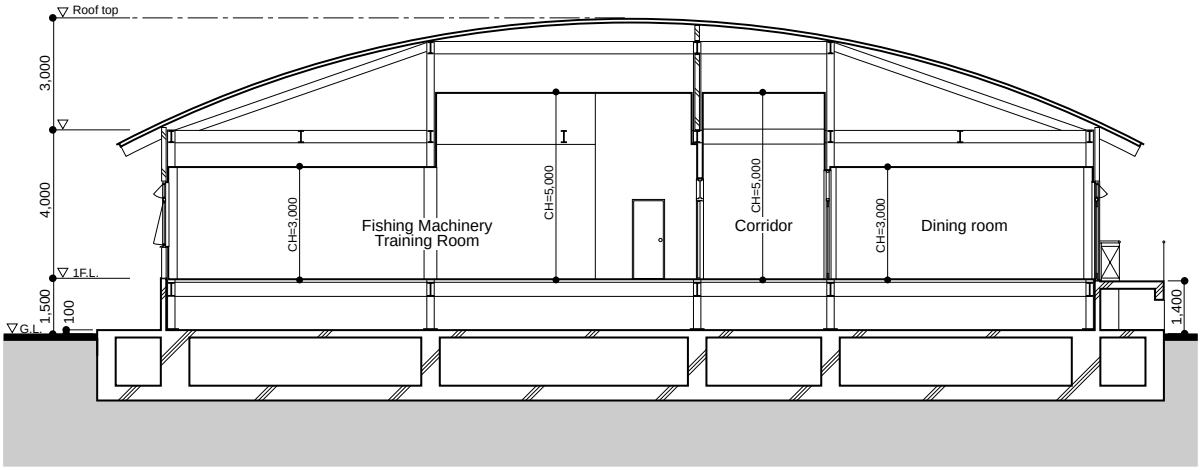


Fig.13 Section Plan

5) Structure Plan

a. Earthquake and wind

(Earthquake)

Although there are very few earthquakes that are bodily felt in the Semarnag area, earthquakes with a magnitude of more than 5 occur several times in a year. Based on interviews with local structural design technicians and others, the design seismic load (V) was calculated in accordance with the local design standard.

$V = C \times I \times K \times W = 0.05 \times 1.5 \times 2.0 \times W = 0.15W$

C : Shear coefficient = 0.05

I : Important factor = 1.5

K : Structure coefficient = 2.0

W : Total load (t)

(Wind)

According to the survey findings for 1985 to 1988, the maximum wind velocity was 24.0m/s. The standard wind velocity was set at 25m/sec and the design wind load (P) was calculated as shown below.

$P = C \times qo \times A \times I$

C : Wind velocity coefficient

qo : Velocity pressure = $1/2\ \rho V^2$ ρ : air density = $1/8 \cdot kg \cdot sec^2/m^4$

A : Effective pressure area

I : Important factor = 1.5

b. Structure of the foundation

Due to the weak ground and irregular settlement, the foundation must be highly rigid. In order to reduce ground settlement caused by the building load, a floating foundation will be installed.

c. Upper structure

In order to cope with ground settlement, the load on the foundation will be reduced and a one-storied, steel rigid frame structure with pin column base will be adopted. For the structure design, the stress and size will follow the standards of Architectural Institute of Japan, and the local natural conditions will also be taken into consideration.

6) Utility Plan

The utility plan will be based on such factors as easy operation and maintenance, durability against salt damage and other natural conditions, reduced maintenance costs, and the ability to withstand ground settlement.

a. Electricity

(Incoming wiring)

Electricity will be provided to the training building from a pole transformer next to the Project site via a low pressure aerial power line and the main distribution board will distribute the power to each outlet, motor, light, etc. The power specifications in Indonesia are 220V, 380V, and the frequency is 50Hz.

A schematic of the single line electrical system is shown in Fig. 14.

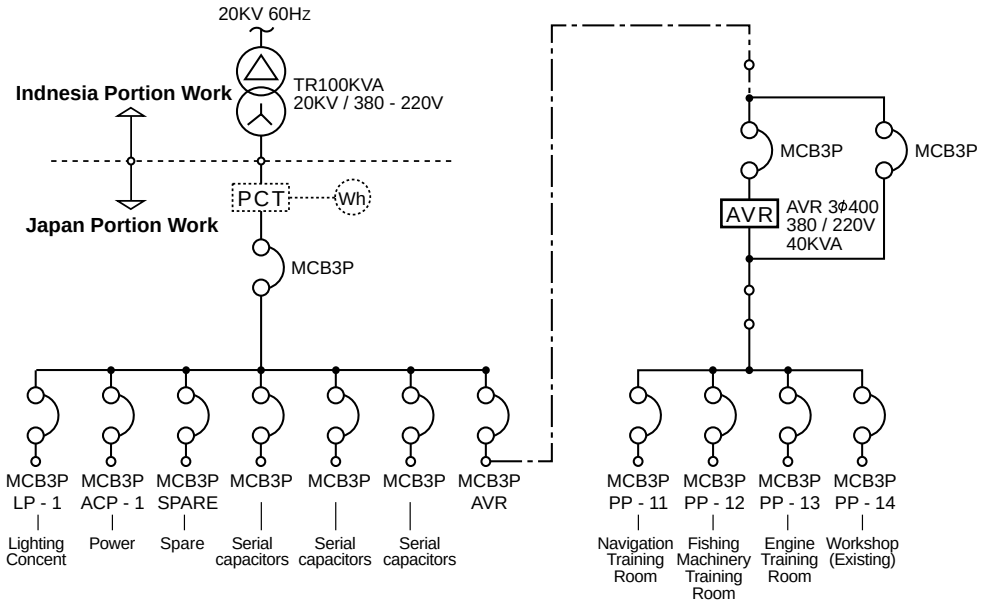


Fig.14 Electrical Single Line

(Main Line)

The electricity within the compound will be provided from the main distribution board in the electricity room to the lighting and power distribution boards and the regulator board (Fig. 15). In principle, the outdoor electricity line will be installed underground in order to prevent salt damage.

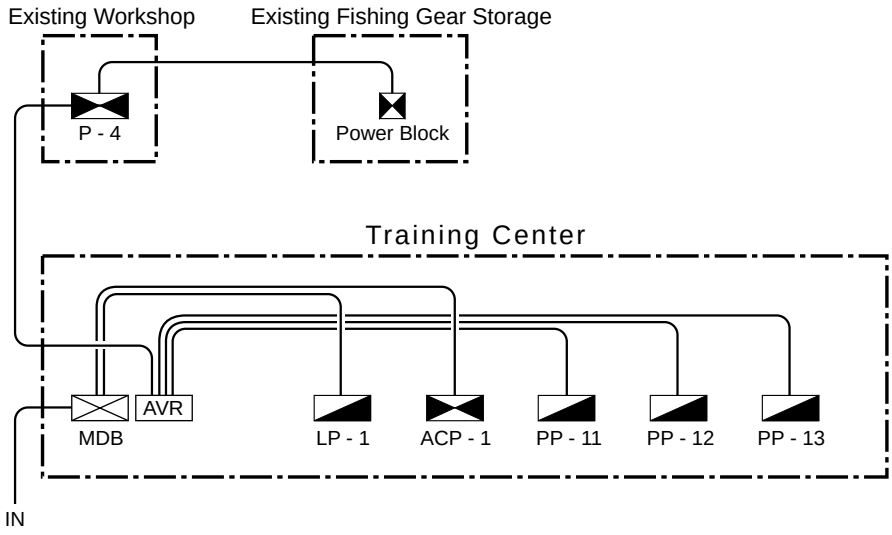


Fig.15 Main Electricity Line System

(Power Supply)

Electricity is distributed to the pump, ventilator, training equipment, etc. through the power distribution board. The power equipment and machine will be selected for their durability against salt damage and water. In addition, piping for electric wires will be PVC, which is durable against salt damage will be installed.

(Lighting and Outlet)

The lighting in the building will be provided by fluorescent lights. The outdoor lights will be waterproof and streetlights will be installed. The outlets for the training equipment and the ventilator will have their own circuit. In order to prevent electricity leakage and electric shock, the outdoor outlets will be waterproof with earth type ground connection and the circuit will be equipped with a short circuit breaker. In principle, the distribution wires for the lights and outlet facilities will be concealed underground. The distribution cable for the existing workshop, etc. will remain exposed and a PVC pipes will be installed, as in the case of the power facilities.

(Communications)

- Telephone

Push phones will be installed and the main phone will be installed in the administrative office with extension phones placed in the instructor's room and the first-aid room. In addition, these phones will also be equipped with an inter-com function.

- Radio Communication (equipment works)

In order to enable communication with the training vessel during its field activities, radio communication equipment will be installed in the navigation training room. Each type of communication equipment will be placed in the navigation training room for training purposes; and an antenna for these equipments will be installed on the roof of the existing main building.

(Emergency equipment)

Emergency lights and emergency exit lighting signs will be installed at the entrance of the building, the corridor, and at other designated locations. All of the emergency lighting equipment will be battery operated as a countermeasure against power failures.

An emergency fire alarm (manual type) will be installed in the corridor and at other designated areas of the building. The receiver will be installed in the office of the main building.

(Machine monitoring)

A monitoring/alarm board will be installed in the office of the main building which will be capable of receiving alarms from the electric facilities, pump, etc. in the event of a power failure, breakdown, or other abnormal activity.

b. Air Conditioning

The air conditioning system for all the rooms will have cooling units that are installed outdoors and an air conditioner unit installed on the wall of each room. Each unit can be controlled separately for operation only in that room. The average temperature in Indonesia is about 28ºC throughout the year. Therefore, a heating system is not required and the air conditioning system will be comprised solely of cooling features. Air conditioning units will be installed in the navigation training room, the lecture room, library, instructor's room 1 and 2, and first aid room.

Private rooms will rely on natural ventilation, but a ventilator will be installed in the electric room, kitchen, toilets, etc. where forced ventilation is required.

c. Water supply/drainage utilities

(Water supply)

The water supply source at the site is well water which is supplied through an underground pipe. Although the required water pressure for the one-storied building

that is planned is not large, the water pressure of the well water is low. Therefore, an outdoor water tank will be installed and a pump will be used to provide added pressure. The maximum volume of water required for one day based on the number of users of the building was calculated at about 2.1 tons.

The water supply system of the water tank is shown in Fig. 16.

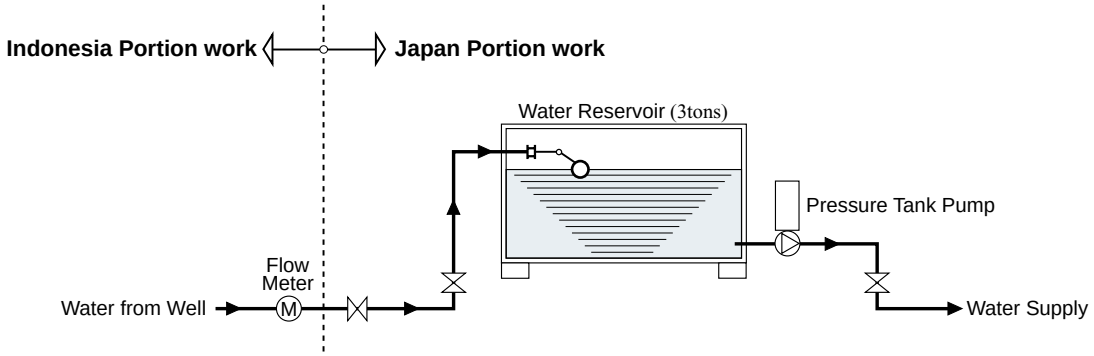


Fig.16 Water Supply System of the Water Reservoir

(Drainage)

A public sewage system has not been installed at the site. Therefore, wastewater, including household wastewater will be collected in a septic tank and a seepage pit for overflow will be installed. A collection company will periodically collect the wastewater. Rainwater will be released directly into the sea via the drainage canal installed at the site.

d. Gas

Gas will be supplied to the kitchen by propane gas tanks that will be installed at the side of the kitchen to enable the tanks to be easily exchanged; and a safe means of storage will be adopted.

e. Fire extinguisher

Fire extinguishers will be placed at required areas in the building and foam extinguishers will be placed in engine training room. In addition, fire hydrants will also be installed outdoors to cover a diameter of 30 meters.

7) Construction materials

The construction materials will be selected according to the following factors.

- Materials that will reduce the structural load of the building will be selected due to ground settlement.
- Materials that are durable against salt damage will be given priority since the facility is located on the coast.
- Local material that can be easily exchanged and replaced will be given priority.
- Local material of relatively stable quality will be given priority.

Materials for finishes are based on the above factors and are detailed in Table 26.

Table 26 Finishing Schedule

<Exterior Finish>

Roof	Stainless steel baked fluorine resin paint
Wall	Aluminum siding
Eaves ceiling	Aluminum siding
Doors & Windows	Window: Aluminum top hanging window Door: Aluminum frame door

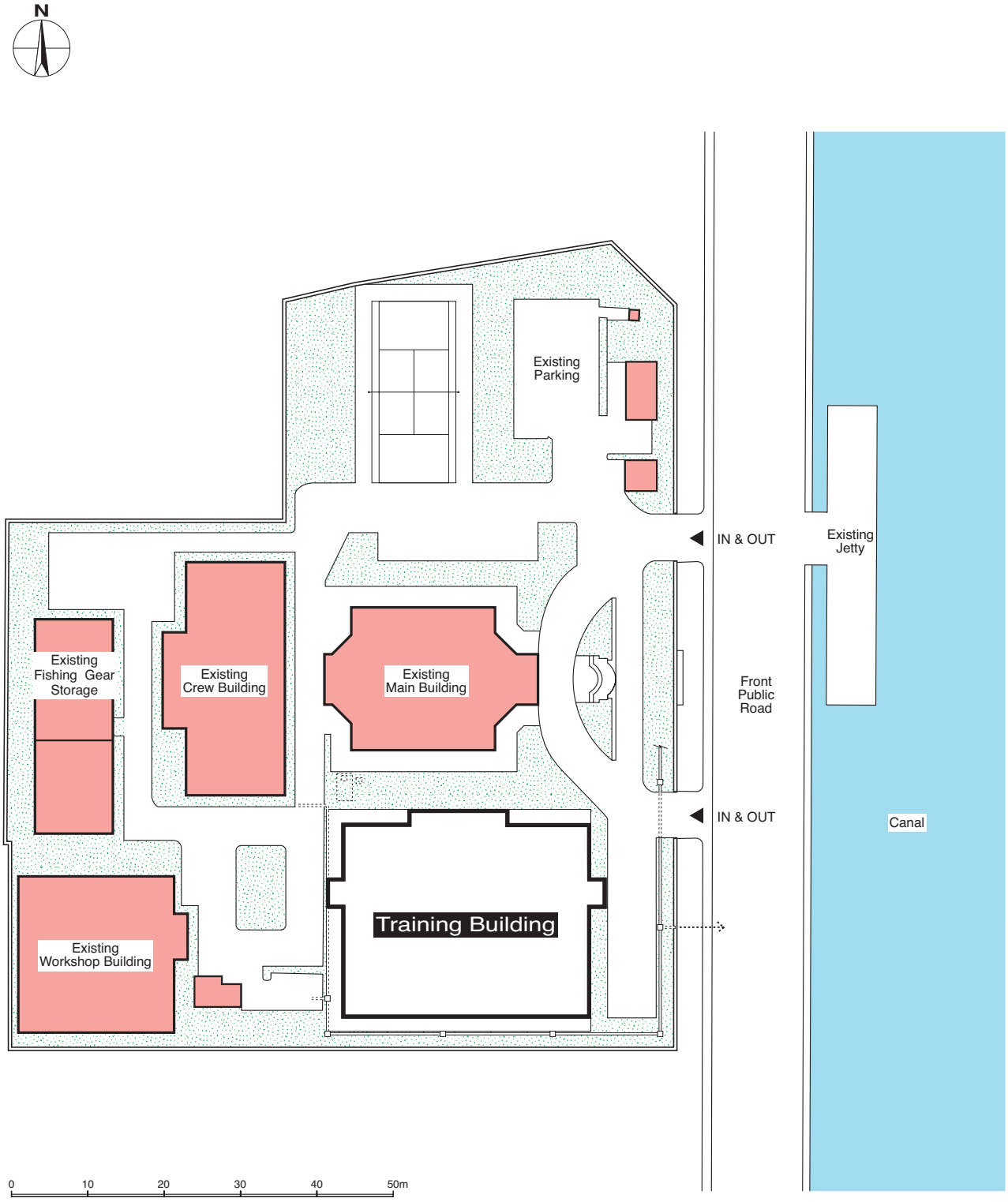
<Interior Finish>

	Floor	Wall	Ceiling	Doors
Rooms & Corridor	Wood Flooring	Cement board Paint finish	Perforated cement board Paint finish	Wood Paint finish
Kitchen & Kitchenette	Tile	Tile	Cement board Paint finish	Wood Paint finish
Toilet	Tile	Tile	Cement board Paint finish	Wood Paint finish

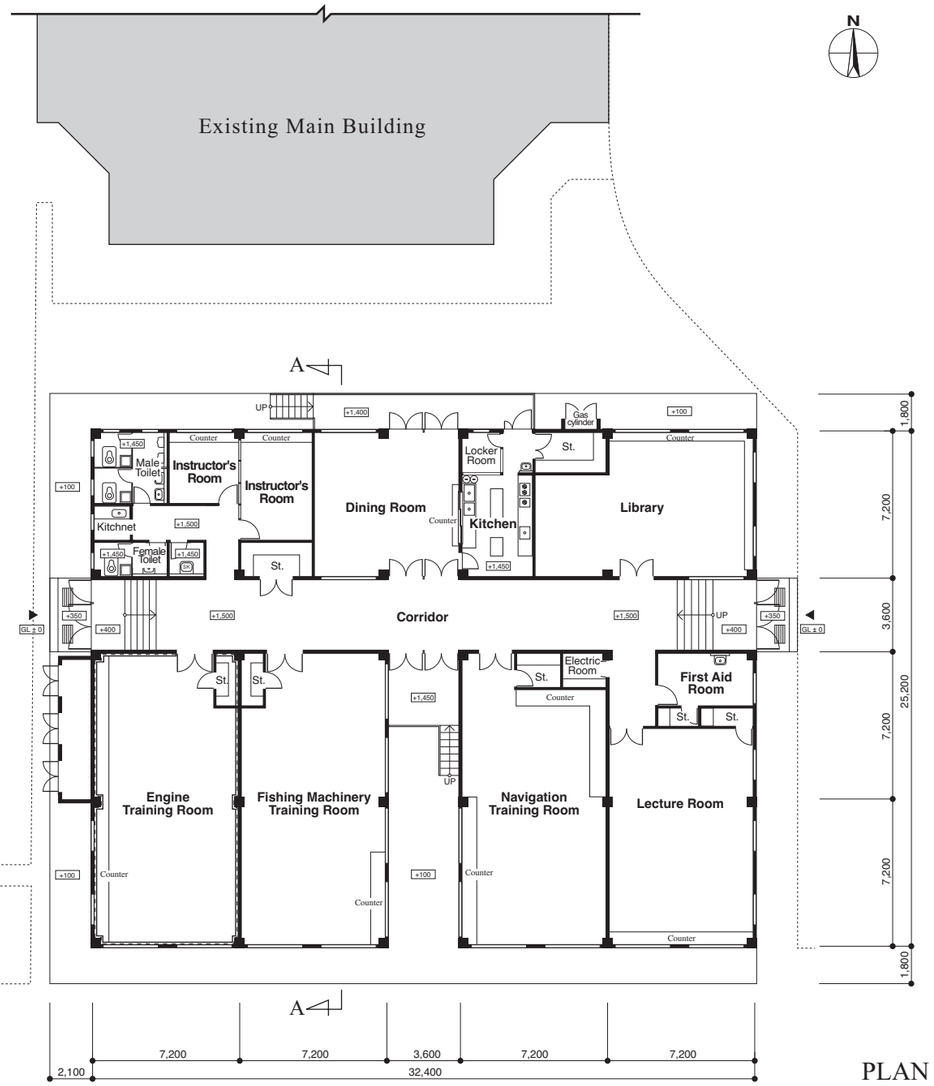
8) Basic design drawing

The basic design of the facility which will be provided in the Project is shown in the following plans.

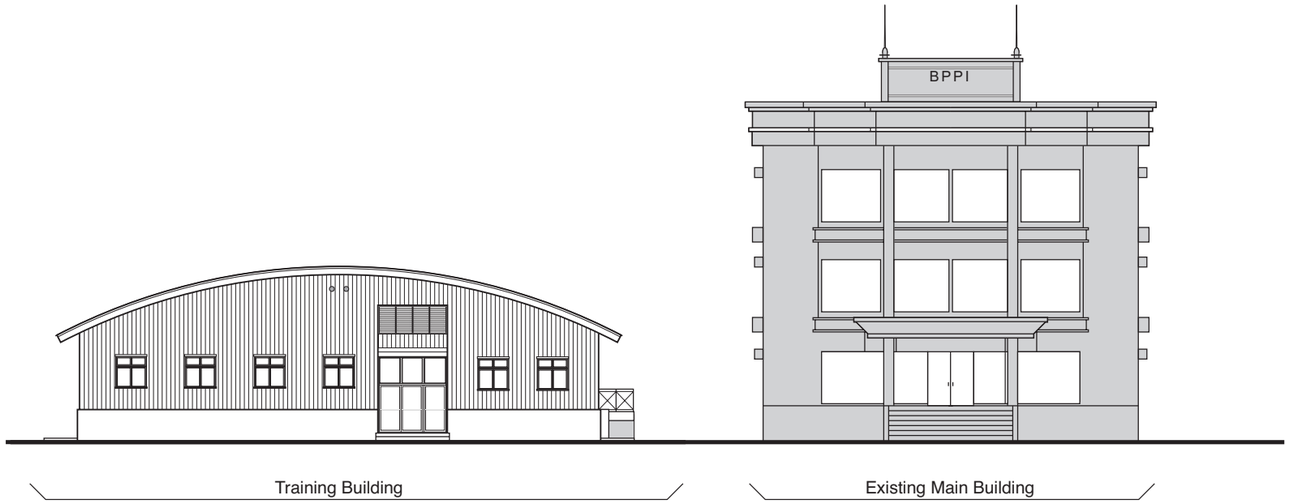
- Layout plan
- Floor plan
- Elevation
- Section



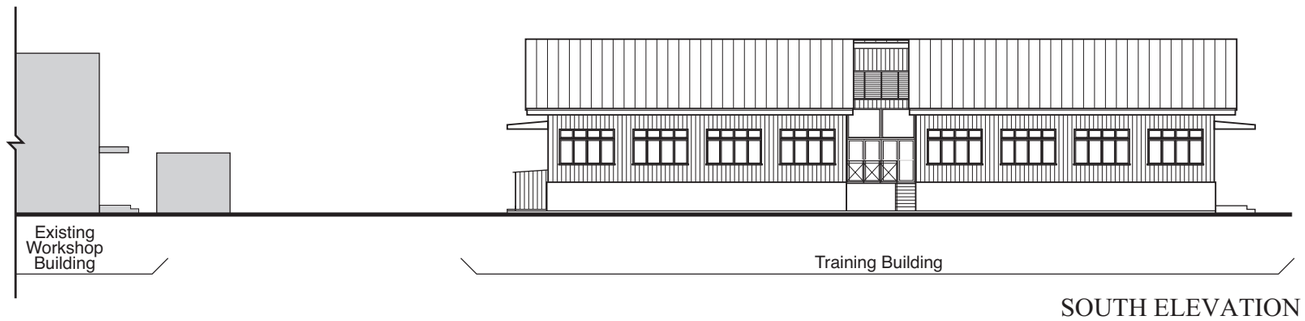
THE PROJECT FOR HUMAN RESOURCES DEVELOPMENT FOR FISHING TECHNOLOGY AND FISHERIES RESOURCES MANAGEMENT IN THE REPUBLIC OF INDONESIA	LAYOUT PLAN		



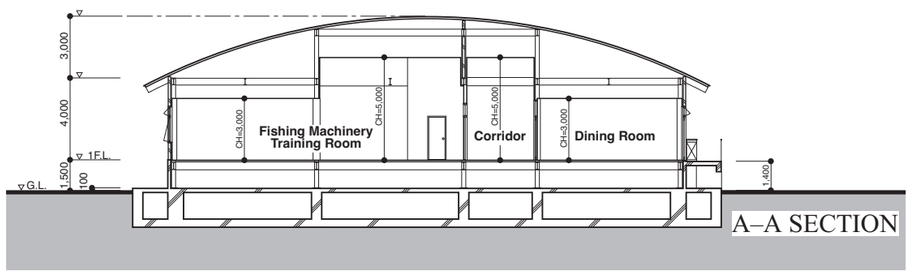
PLAN



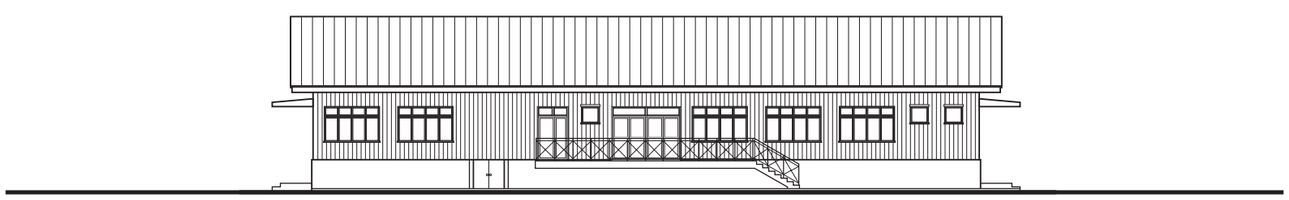
EAST ELEVATION



SOUTH ELEVATION



A–A SECTION



NORTH ELEVATION

THE PROJECT FOR HUMAN RESOURCES DEVELOPMENT FOR FISHING TECHNOLOGY AND FISHERIES RESOURCES MANAGEMENT IN THE REPUBLIC OF INDONESIA	SCALE 1 : 300	TRAINING BUILDING – PLAN • ELEVATION • SECTION

(3) Equipment Plan

1) Total equipment plan

The equipment that will be provided under the Project, including the fishing and navigation training unit, are divided into seven categories. Each unit will be installed in the locations as shown in Table 27.

Table 27 Installation Site of Each Equipment

Equipment	Installation	Remarks
Fishing and Navigation training unit	Navigation training room	
Fishing machinery training unit	Fishing machinery training room	Power block will be installed for repairing of fishing gear
Marine engine training unit	Engine training room	
Lecture equipment	Storage	
Workshop equipment	Workshop building	
Multi purpose small scale training vessel	Jetty of FTDC	
Trainee's bus	Parking of FTDC	

All the equipment will be installed in the center's facilities. The center contains such infrastructure such as electricity, water, etc. that are required to operate the equipment as well as access roads to transport the equipment to the respective facilities. Therefore, it is an appropriate site to install the equipment.

As shown in Table 27, the navigation, fishing, and engine training units will be transported and installed in the respective training rooms. The lecture equipment will be installed in the teaching materials preparation room for use in the lecture room whenever required.

The workshop equipment will be installed in the existing workshop building and their integrated use with the existing equipment is encouraged. However, it is necessary to install a separate cable and power supply for the new equipment and power block.

The small multipurpose training vessel will be moored at the jetty in front of the center and the training bus will be parked in the center's parking lot.

Based on the above plan, an effective training program can be implemented by integrating the use of land and marine training equipment.

2) Equipment list

Based on the equipment plan explained in section 1-2-4, the list of equipment that will be provided under the Project is shown on the following page.

3) Equipment layout

The layout of the requested equipment in the new and existing facilities is given in the equipment layout plan which is attached to the equipment list.

List of Equipmwnt

Item No.	Name of item	Q'ty	Specification	Place of use	Main purpose
100	Fishing and Navigation training unit				
101	Fishfinder training unit	1	10" color monitor Echo generator, Transducer	NTR	Operation and maintenance training for fish finder
102	GPS training unit	1	GPS receiver Video plotter, antenna, cable	NTR	Operation and maintenance training for GPS navigator
103	Radar training unit	1	Radar simulator (Non STCW regulation) 1- Trainer's cubicle 1- Trainee's cubicle	NTR	Operation and maintenance training for Marine radar
104	Weather facsimile receiver unit	1	Weather facsimile receiver 8"recording paper	NTR	Operation and maintenance training for Weather fax
105	GMDSS Training unit	1	1-trainer's cubicle (MF/HF, VHF, etc) 3-trainee's cubicle (VHF) Simulation program	NTR	Operation and maintenance training for GMDSS equipments
200	Fishing machinery training unit				
201-1	Line/net hauler	1	Tuzumi drum type Capacity 600kg	FMTR	Operation and maintenance training for Hydraulic fishing machinery
201-2	Purse winch	1	2 drum type purse winch Capacity 1000kg	FMTR	
201-3	Main drum	1	Main drum for tuna longline Capacity 6.9kg	FMTR	
201-4	Branch reel	1	Branch reel drum Hand drive type	FMTR	
201-5	Hydraulic pump unit	1	Electronic hydraulic pump unit Capacity 11kw Central stand control and machine side control	FMTR	
201-6	Power block	1	Electronic driven power block Capacity 1ton, with stand	Store	Operation training for power block and fishing gear repairment
202	Fishing gear materials for tuna longline	1	Nylon mono filament main line Net length 4000m, 100 hooks	FMTR	Training for fishing gear arrangement
203	Fishing gear materials for bottom gill net	1	Nylon multi filament gillnet Net length 400m, mesh size 130mm	FMTR	Training for fishing gear arrangement
204	Fishing gear materials for bottom long line	1	Vinilon main line bottom longline Line length 1000m, 120 hooks	FMTR	Training for fishing gear arrangement
205	Fishing gear materials for hand line	1	Nylon mono filament line Length 200m	FMTR	Training for fishing gear arrangement
206	Fishing gear materials for artificial bait	1	Artificial bait for tuna and skipjack, squid	FMTR	Training for fishing gear arrangement
207	Fishing gear materials for pot fishing	1	Square type lobster pot Round type crab pot etc	FMTR	Training for fishing gear arrangement
208	Fishing gear materials for fishing gear design	1	Material for shrimp trawl net model TED for trawl, Material for purse seine net model	FMTR	Training for fishing gear arrangement, new fishing gear development
209	Fishing gear materials for purse seine (sardine)	1	Nylon purse seine net, Net length 230m, depth 63m, mesh size 1"	FMTR	Training for fishing gear arrangement
300	Marine engine training unit				
301	Main diesel engine training unit	1	1. Marine diesel engine abt. 80HP 2. Dynamometer hydraulic type 3. Cooling tower etc.	ETR	Operation and maintenance training for marine diesel engine
302	Engine cut model	1	4 cycle diesel engine Output abt. 80HP	ETR	Understanding for engine inside structure
303	BHP and torque meter	1	Potable type Output abt. 100HP	ETR	Understanding for BHP curve
305	Out board motor	1	Gasoline type Output abt. 50HP	ETR	Operation and maintenance training for outboard engine
400	Lecture equipment				
401-1	Color monitor	1	Color monitor 28 or 29"	Lecture room	For audio visual teaching material
401-2	VHS video cassette player	1	Video cassette player VHS type	Lecture room	For audio visual teaching material

List of Equipmwnt

Item No.	Name of item	Q'ty	Specification	Place of use	Main purpose
402	OHP	1	Potable type A4 size stage, zoom provided Halogen lamp 250～400W	Lecture room	For seminar and lecture
403	Slide projector	1	Portable type Halogen lamp 300W, zoom provided	Lecture room	For seminar and lecture
404	Screen	1	Screen with stand Size 1800×1800mm	Lecture room	For seminar and lecture
406	Personal computer	1	Desktop type OS: windows	Trainer's room	Development for text, guidance, report and paper
500	Workshop equipment				
501	Hand fork lift	1	Capacity 1000kg fork length 1000mm	Work shop	Transport heavy equipment
502	Hydraulic press	1	Capacity abt. 15ton	Work shop	Repairment for winch shaft etc.
503	Air compressor	1	Max pressure 9.5kg/cm2 Air tank capacity abt. 120L	Work shop	Cleaning machinery, power source for air impact wrench
504	Metal cutting machine	1	Table type Edged tool abt. 305mm	Work shop	Repair fishing machinery, Ship's construction
505	Arc welder	1	Rated current 180A	Work shop	Repair fishing machinery and ships
506	Gas welding tool set	1	Welding torch, tips, oxygen & acetylene regulator	Work shop	Repair fishing machinery and ships
507	Circuit tester	1	Max voltage 600V Max ampere 500mA	Work shop	Maintenance for electric device
508	Cramp meter	1	Max ampere 300A Max voltage DC 60V	Work shop	Maintenance for electric device (measure ampere)
509	Mega tester	1	Max voltage 500V Resistance 100MΩ	Work shop	Maintenance for electric device
510	Nozzle tester	1	Capacity 500kg/cm2	Work shop	Test for fuel injection valve
511	Air impact wrench	1	Bolt dia 8mm, 16mm each	Work shop	Assemble for any machinery
512	Electric bench grinder	1	Bench type Disk dia 150mm	Work shop	Metal shaving , shaper
513	Handy disc sander	1	Handy type Disk dia. 100mm	Work shop	Rust removement from ship's hull
514-1	Screwdriver set	1	Each size 6 kinds	Work shop	Assemble machinery
514-2	Socket wrench set	1	Deep type 8 kinds Small type 8 kinds	Work shop	Assemble machinery
514-3	Hexagon wrench set	1	Each size 12 kinds	Work shop	Assemble machinery
514-4	T type wrench and handle	1	Each size 13 kinds	Work shop	Assemble machinery
515	Dial indicator	1	Min graduation 0.01mm with magnetic stand	Work shop	Measurement
516	Surface plate	1	Size 500×750×100mm accuracy 44μm	Work shop	Check for accuracy
517	Hydraulic arm jack	1	Capacity 1ton, lifting height 2100mm arm length 1500mm	Work shop	Transfer heavy materials
518	Lathe machine	1	Distance between center 800mm Spindle drive motor 1.5kw	Work shop	Metal works (winch shaft etc.)
519	Aluminum welder	1	Max output current 300A with torch and remote control	Work shop	Aluminum welding
520	Pipe bending tool	1	Max bending capacity 2" Max bending angle 90°	Work shop	Metal pipes bending
522	High pressure compressor	1	Driven by gasoline engine air cooled max presser 19.6Mpa	Work shop	filling air to diving air tank
525	Diving regulator	1	can be used for 19.6Mpa	Work shop	Marine research, check ship's bottom
526	Diving air tank	1	Tank capacity 14L	Work shop	Marine research, check ship's bottom

List of Equipmwnt

Item No.	Name of item	Q'ty	Specification	Place of use	Main purpose
528	Wooden sharpener	1	Table type,Max. shaving width 300mm Max shaving depth 155mm	Work shop	Wood works, wooden ship's hull construction
529	Wooden cutting machine	1	Table type Max. cutting capacity 315mm	Work shop	Wood works, wooden ship's hull construction
532	Metal shaving machine	1	Bench type	Work shop	Metal shaping works
533	Metal hacksaw	1	Max cutting capacity 130mm	Work shop	Making mast for fishing machinery
600	Multi purpose small scale training vessel				
601	Small scale multi purpose training vessel	1	Purse seiner training vessel FRP made LOA abt. 16m International GT abt. 28 ton M/E out put 280HP		Fishing training, development for new fishing gear, educational activity to artisanal fishing village
602	Purse seine net for training vessel	1	Purse seine net complete set Net length abt. 230m, mesh size 1"	Training vessel	Fishing training for purse seine
603	Gill net for training vessel	1	Gill net complete set Net length abt. 200m, mesh size 130mm	Training vessel	Fishing training for gillnet
604	Bottom long line for training vessel	1	Bottom longline complete set Line length abt. 1000m, 120hooks	Training vessel	Fishing training for bottom longline
605	Hand line fishing gear for training vessel	1	Hand line Length abt. 200m with wooden flame	Training vessel	Fishing training for handline fishing
606	Under water light	5	Capacity 1kw 220V ordinary bulb	Training vessel	For purse seine operation
607	Tool for operation for training vessel		Spike, net needles etc	Training vessel	Repair fishing gear, adjustment for fishing gear when trial operation
700	Other equipments				
701	Trainee's bus	1	Max. capacity 30 persons Diesel engine manual transmission		Trainee's transportation, Field activity, mobile training
702	Trainee's table for lecture room	30	Wood with open shelf Urethane clear lacquer finish	Lecture room	Lecture
703	Trainee's desk for lecture room	30	Wood Urethane clear lacquer finish	Lecture room	Lecture
704	Trainer's desk	4	Wood with open shelf Urethane clear lacquer finish	Lecture room, etc	Lecture
705	Trainer's chair	10	Steel with caster	Lecture room, etc	Lecture
706	Trainee's stool	90	Wood stool round type	NTR, FMTR,ETR	Lecture
706-1	Working table for Navigation training room	3	Formica table top	NTR, FMTR,ETR	Practice, lecture
706-2	Working table for Fishing & Engine training room	6	Laminated timber table top	NTR, FMTR,ETR	Practice, lecture
707	White board	4	Aluminum flame 1800×1800mm	Lecture room, etc	Practice, lecture
708	Dining table	5	Formica table top	Dining	For dining room
709	Dining chair	30	Steel pipe frame wood vinyl fabric	Dining	For dining room

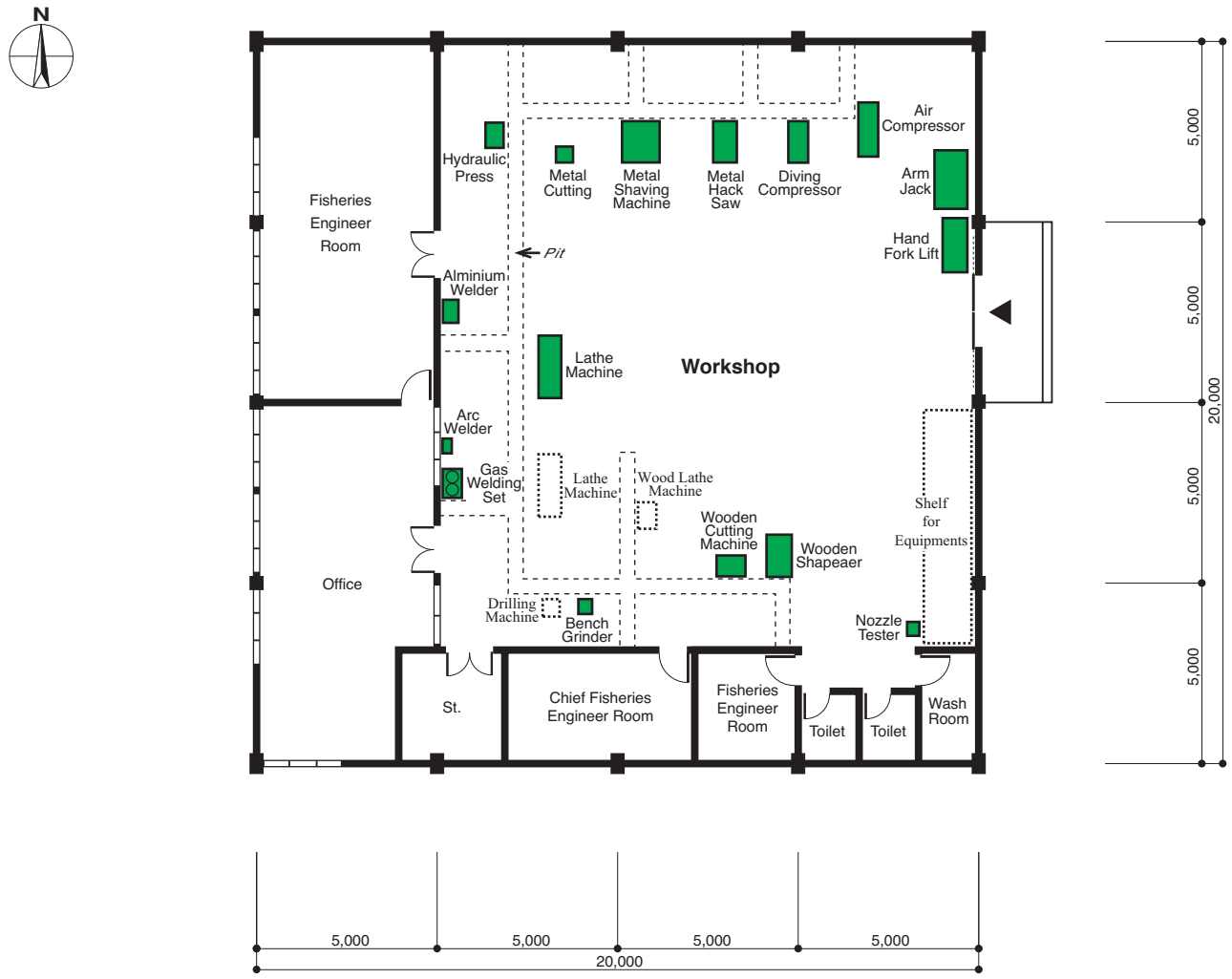
《LEGEND》

: Provisional Equipment

: Existing Equipment

S = 1 : 200

EQUIPMENT LAYOUT PLAN FOR TRAINING BUILDING



《LEGEND》

: Provisional Equipment

: Existing Equipment

S = 1 : 200

EQUIPMENT LAYOUT PLAN FOR WORKSHOP BUILDING

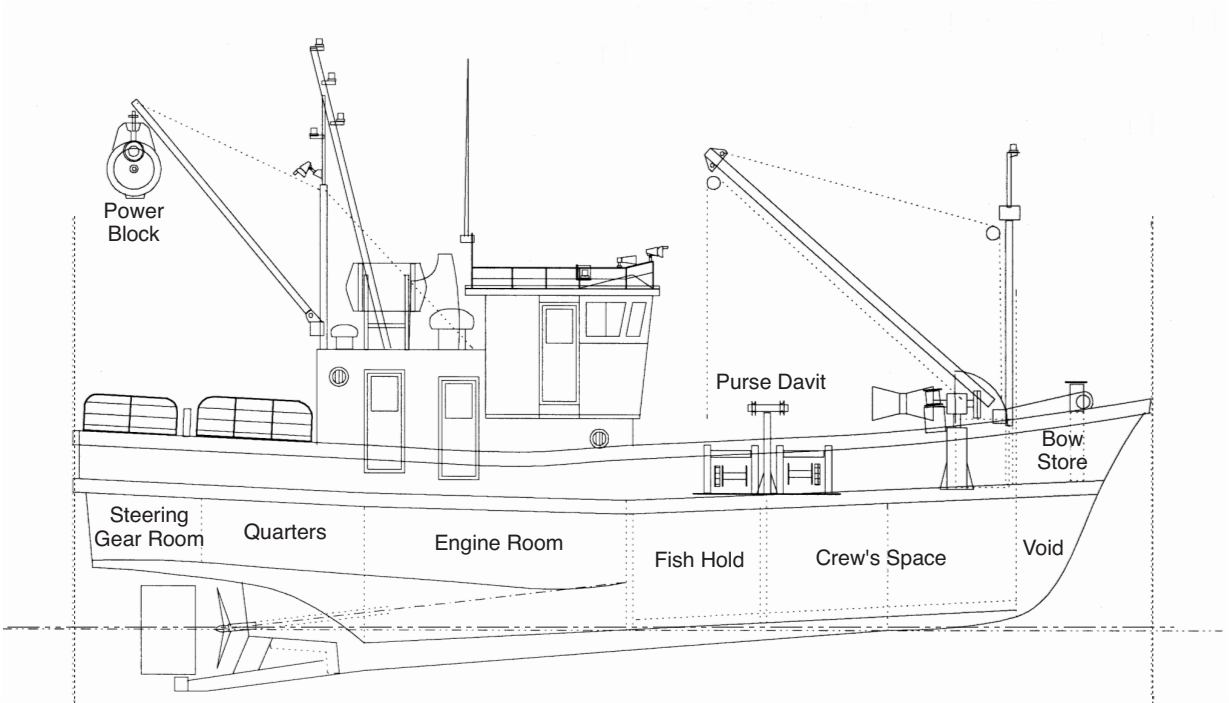
(4) Naval Architectural Plan

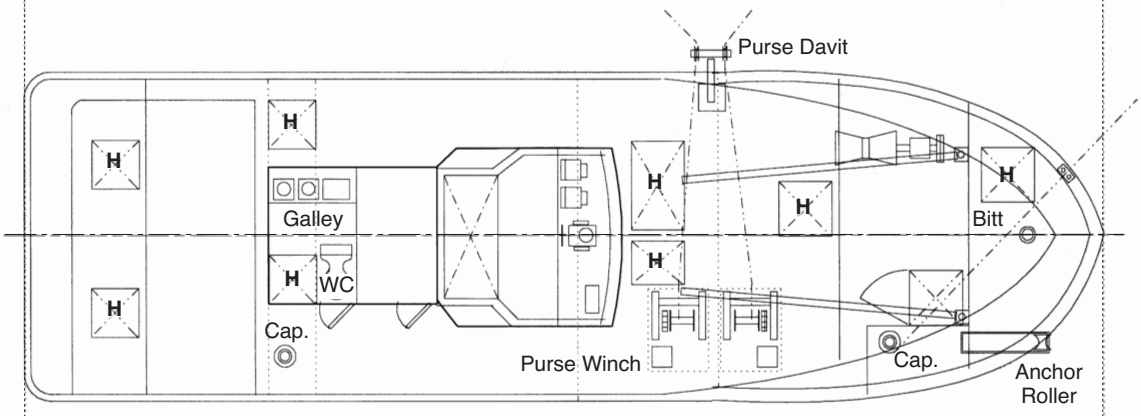
Based on the basic themes explained in section "2-2-4 Equipment Plan", the specifications shown in Table 28 are planned with regard to the small, multipurpose training vessel that will be provided under this Project.

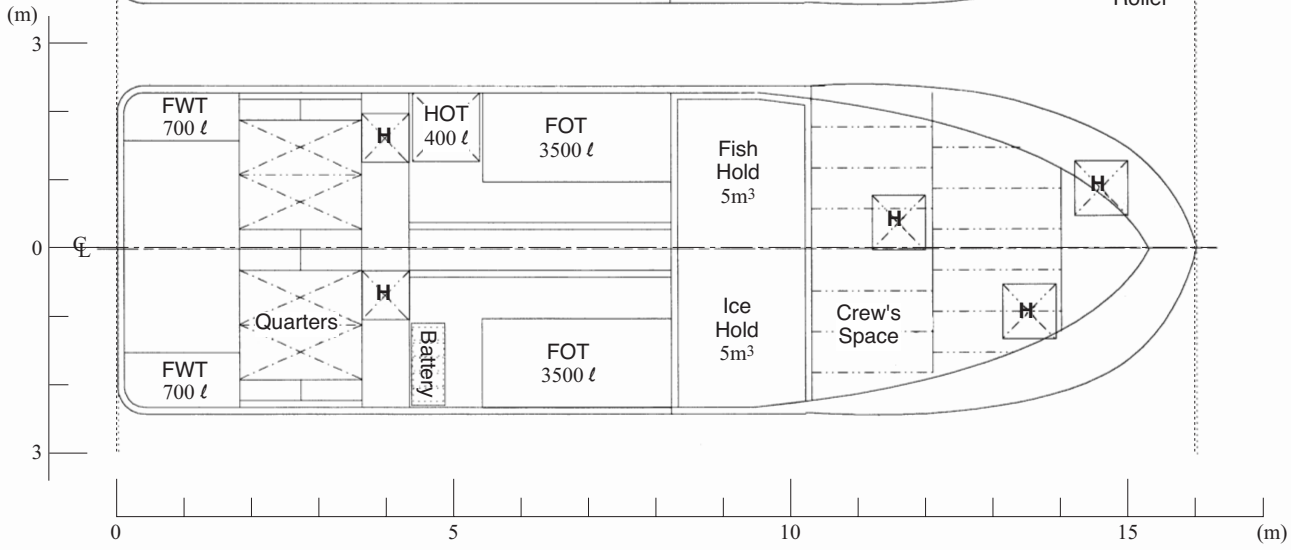
Table 28 Specifications of the Multipurpose Small Scale Training Vessel

1)	Principal particulars	
	Type of fishing	Purse seiner
	Material	F.R.P.
	Length overall	Approx. 16 m
	Tonnage : International	Approx. 28 ton
	Main engine	Capacity 280 HP
	Ice/fish hold	Approx. 10.0 m^3 (5.0 m^3 x 2)
	Fuel oil tank	7 m^3
	Fresh water tank	Approx. 1.4 m^3
	Compartment	6 beds Max. 20persons
	Endurance	Approx. 900 miles
2)	Hydraulic fishing machinery	
	Purse winch	1 ton - 30 m : purse line rewind type (steel wire 12 mm : 400 m)
	Power block	1 ton - 30 m
	line / net hauler	for bottom longline and gillnet
	Main boom topping winch	1 set
	Capstan winch	2 sets
	Forward cargo boom	2 sets
	Cargo winch	2 sets
3)	Navigation instruments	
	Gyro compass with auto pilot	
	Daylight radar with simplified ARPA	
	GPS with color monitor	
	Radio equipment	MF/HF and VHF with DSC & DSCWR
	(GMDSS A2 area)	Two way radio (2), EPIRB SART NAVTEX
	Color fish finder	
	Searchlight sonar	
	Direction finder (MF/HF)	
	Radio buoy	
	Anemometer	
4)	Safety equipment	Life raft with stand, life jackets
5)	Fishing gear	
	Purse seine fishing for sardine	Length Approx. 200 m, mesh size 1"
	Gill net	Length Approx. 200 m, mesh size 130 mm
	Bottom long line	Length Approx. 400 m, number of hooks 120 pcs
	Handline fishing	Length Approx. 200 m
	Accessory	Under water light, tool for fishing gear arrangement

Length:	16.00m	Gross tonnage:	app. 28tons
Breadth:	4.70m	Main engine:	280 PS
Depth:	1.74m	FOT:	7000 ℓ
Draft:	0.55m	FWT:	1400 ℓ
Fish Hold:	app. 5m³	Compartment:	20 persons
Ice Hold:	app. 5m³	Class:	BKI/NK







THE PROJECT FOR HUMAN RESOURCES DEVELOPMENT FOR FISHING TECHNOLOGY AND FISHERIES RESOURCES MANAGEMENT IN THE REPUBLIC OF INDONESIA	Muti-Purpose Small Scale Training Vessel Projection		

Chapter 3. Implementation Plan

Chapter 3 Implementation Plan

3-1 Implementation Plan

3-1-1 Implementation Concept

(1) Project Implementation System

The implementing agency of the Project is the FTDC. Following the Exchange of Notes (E/N) between the governments of Japan and Indonesia, the Japanese consultant company will sign a contract with the Indonesian government pertaining to the implementation of the detailed project design and the supervision of the construction works for the Project. In addition, a Japanese contractor will sign a contract with the Indonesian government regarding the construction work and the procurement and installation of the equipment which will be provided by the Project. The work carried out by the contractor will be placed under the supervision of the Japanese consultant company. Following the completion of the construction works, the FTDC will take over the management and operations of the Project as the responsible implementing agency.

(2) Implementation Concept

The Project will be implemented according to the concept delineated below, in accordance with its implementation as a Japanese government grant aid project.

1) The Project implementing agency on the Indonesian side and the Japanese consultant and contractor will conduct an adequate exchange of opinions, maintain close communication, and efficiently carry out the works.
2) The implementation schedule will incorporate the adequate procurement of labor, equipment, and materials and the schedule will be managed flexibly in order to reflect local conditions and to enable the construction works to be carried out efficiently.
3) As the construction works related to the Project will be conducted during the operating hours of the existing facilities, the safety factor will be considered in the temporary work plan and effort will made not to disrupt the activities of the center.
4) Since the site borders the ocean, measures will be taken to store the construction equipment and materials in order to avoid the damaging effect of salt winds.

5) The responsibility for the installation of electricity, water supply, drainage, and other utilities will be clearly defined and the scope of works will be carried out efficiently and without any interruption.
6) Effort will be made to prevent accidents during the temporary storage, transport, and installation of the construction equipment and materials.

3-1-2 Implementation Conditions

The following factors will be taken into consideration when implementing the Project.

1) It is difficult to secure a large area, which will serve as a temporary work yard during the construction phase, due to the limited area of the Project site. Therefore, in order to prevent lowered working efficiency, a temporary work plan will be prepared.
2) Due to the weak ground condition of the Project site and the surrounding area, construction methods with minimal vibration, noise, and environmental impact will be employed as much as possible.
3) A Japanese government grant aid project is tax exempt. The Indonesian side will be responsible for procuring tariff exemption documents and customs clearance of equipment and materials imported from Japan from the authorities concerned. The contractor will be responsible for adequately communicating with the implementing agency on this matter and to proceed with the documentation in accordance with Indonesian laws.

3-1-3 Scope of Works

The works for the Project will be divided between the work undertaken by the Japanese and Indonesian sides as shown in Table 29.

Table 29 Scope of Works

Scope of Work	Japan	Indonesia
1. Securing and clearing of the site and temporary work area		O
2. Installation of public utilities to the site		
- Installation and permit of electricity line with. auxiliaries		O
-. Revamping of well, repair of water supply pipe and permits of them		O
- Installation and permit of public phones with auxiliaries		O
3. Banking of the access road to the site		O
4. Planting work within the compound		O
5. Construction work		
- Buildings in the compound	O	
- Roads in the compound	O	
- Exterior lighting	O	
6. Equipment		
- Equipment/material procurement	O	
- Installation work	O	
- Test operation/adjustment of equipment	O	
- Instruction on equipment use	O	
7. Import / customs procedures		
- Tax exemptions and customs clearance		O
8. Payment of B/A commissions to a foreign exchange bank in Japan.		O
9. Arrangement for the stay and immigration procedures of Japanese nationals going in/out of Indonesia in conjunction with project -related work.		O
10. Maintenance and use of the facilities constructed and equipment purchased properly and effectively.		O
11. Responsibility for all the expenses, other than those borne by the grant, necessary for the construction of the facilities as well as the transportation and installation of the equipment.		O
12. Responsibility for all permits/applications required for the execution of construction work.		O

3-1-4 Construction Supervision Plan

(1) Construction of the Facilities

The basic policy regarding the supervision of the construction works and the factors which will be considered are explained below.

1) In order to efficiently implement the construction works and the transport and installation works of the equipment, close coordination between the Japanese consultant company and the FTDC is required. The timing of the various types of infrastructure work, which the Indonesian side will be responsible for carrying out must be especially coordinated in order to ensure that it does not overlap with the

construction work by the Japanese side. Prior discussions regarding the work schedule and specifications will be conducted.

2) Prior to the start of the construction works, the implementation plan and drawings submitted by the contractor will be sufficiently studied and the temporary work plan, construction schedule, the quality of the planned equipment and materials, and the construction methods will be reviewed for their suitability.

3) Following the completion of the construction works and the transfer of the Project to the Indonesian side, the content of the finished work and the specifications of the equipment provided under the Project will be reviewed and instructions for repair work will be carried out wherever necessary and appropriate.

4) An engineer will be permanently assigned at the site and technical personnel for structure, facility and equipment will be sent when needed to supervise the on-site construction.

(2) Installation of the Equipment

The fishing and navigation training unit, the fishing machinery training unit, the marine engine training unit, and the workshop equipment will be installed under the Project. The installation of the engine in the marine engine training unit must be coordinated with the water supply, fuel, and cooling facilities. In addition, the fishing machinery training unit and the marine engine training unit vibrate during their operation. Therefore, the installation of these units must be executed taking this factor into consideration and must be closely adjusted to the construction works. The installation of the equipment is closely related to the progress of the exterior finishing work on the facility. Therefore, prior discussions on the transport, installation methods, etc. must be adequately carried out.

The fishing and navigation training unit is comprised of various types of communication units and requires the installation of an antenna on the roof of the existing main building. Therefore, the installation of the wiring, cables, etc. must be integrated with the construction schedule and requires detailed discussions with the contractor of facilities. In addition, the wireless communication unit must be registered. The implementing agency and the contractor will be responsible for registering the equipment.

3-1-5 Procurement Plan

(1) Facilities

Nearly all of the construction related materials such as cement, aggregates, tiles, fixtures, furniture, telephone lines, cables, distribution board, lighting fixtures, sanitary apparatus, etc. are produced in Indonesia and can be procured locally. However, based on the content and specifications of the Project, there are quality-related issues for some of the material. In view of these circumstances, the materials which will be used in the Project will be procured as shown in Table 30.

Table 30 Origin of Equipment/Materials Procurement and Means of Transport

Equipment/Materials	Indonesia	Japan	Transport Method
1. Building Material			
・structural steel, steel bar, waterproof agent, acoustic board, glass	○		
・others		○	Marine Transport
2. Materials for Utility			
・cable/wire, illumination apparatus, sanitary apparatus, pipe	○		
・air conditioner, etc.	○		

(2) Equipment

Of the equipment that will be provided by the Project, the simulation training units are all imported items from Japan or the EU since none of the equipment is manufactured locally. Detailed discussions must be carried out between the equipment manufacturer and the contractor regarding the transport and installation of the equipment. Since a high ratio of the equipment on local fishing boats are of Japanese manufacture, it is recommended that the equipment is procured in Japan.

The majority of the Japanese manufacturers maintains branch offices and affiliated sales offices in Jakarta and other cities in Indonesia, and procuring spare parts and consumables will not be a problem.

Conversely, the imported parts of personal computers and printers, and other office equipment can be assembled in Indonesia and the quality is reliable for Japanese products manufactured in Indonesia.

Therefore, in view of these factors, in principle, the equipment that will be provided by the Project will be procured in Japan to ensure efficient and timely delivery. However, personal computers will be procured locally due to the reliable quality and the advantages of having a maintenance agreement with local suppliers.

The procurement plan for equipment is shown in Table 31.

Table 31 Procurement Plan for Equipment

Kind of Equipment	Origin of procurement	Remarks
1) Fishing and navigation training unit	Japan	No local product
2) Fishing machinery training unit	Japan	No local product
3) Marine engine training unit	Japan	No local product
4) Tuition apparatus	Local market for limited articles	Limited articles such as personal computers have no quality problem.
5) Workshop equipment	Japan	Local products have problems of quality, accuracy and durability
6) Small multipurpose vessel	Japan	Local shipbuilding has difficulties
7) Bus for trainees Desks and chairs	Local Market	No problem with quality, easy procurement and cheap for local products

3-1-6 Implementation Schedule

Following the signing of the E/N between the two countries, preparation of the tender document, and the tendering and signing of contracts for the construction works, equipment procurement and installation will be carried out. The construction works and equipment procurement and installation will be conducted after the contract has been signed. The implementation schedule will be carried out as explained below.

(1) Detailed Design

Based on the basic design report, details of the Project design will be prepared and tender documents will be compiled. The total estimated time for this task is three months.

(2) Tendering

Following the completion of the detailed design, the task of confirming it will be carried out in Indonesia. This will be followed by a public tender notice in Japan to parties interested in participating in the tender for the construction works, equipment procurement and installation of the Project. The pre-qualification of the interested parties will be

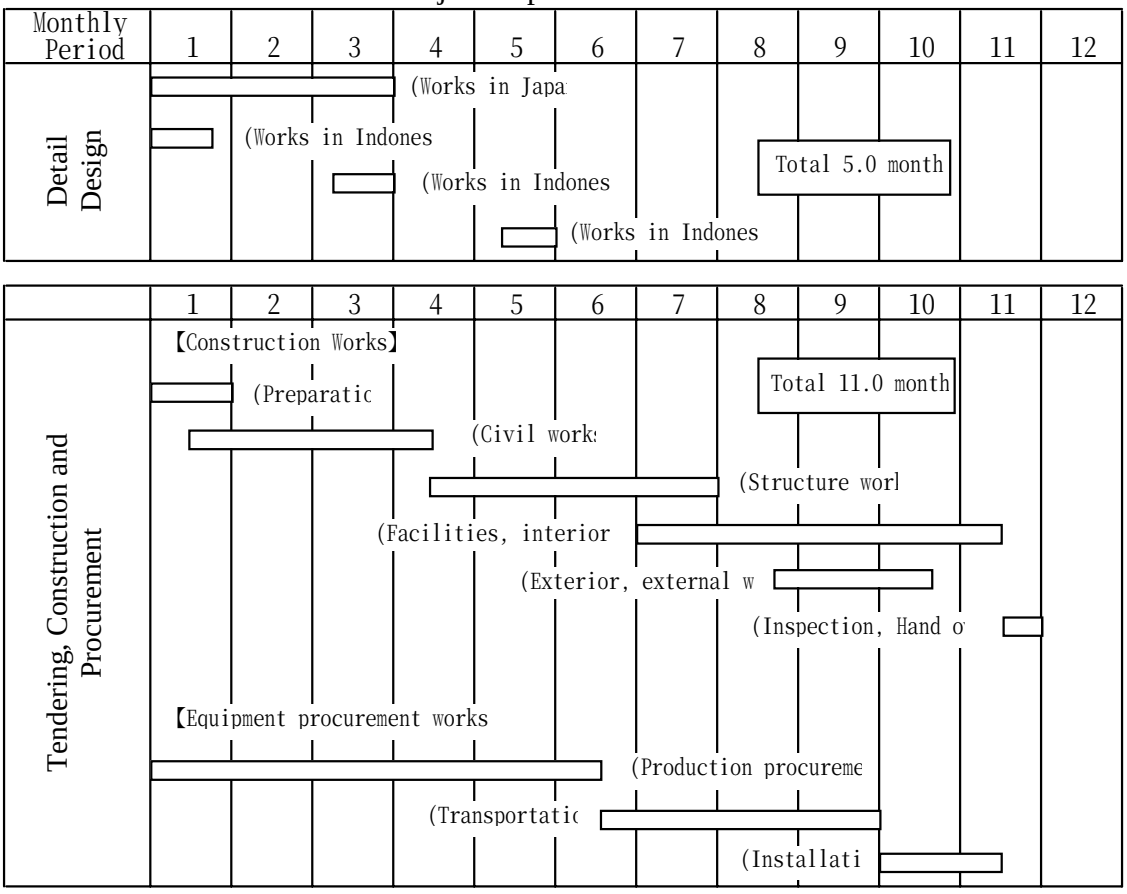
conducted and the participants will be selected. Based on the results of the pr-qualification, the participants will be informed by the implementing agency. The tendering will be conducted in the presence of related persons. This process will require two months.

(3) Construction Works and Equipment Procurement and Installation

Following the signing of the construction contract, the construction works and equipment procurement and installation will begin with the Japanese government's approval. The required duration of these works is estimated at 11 months.

The project implementation schedule for the entire process is shown in Table 32.

Table 32 Project Implementation Schedule



3-1-7 Obligation of the Recipient Country

The project implementing agency on the Indonesian side, the FTDC, and other relevant Indonesian institutions will be responsible for fulfilling the tasks listed below within the specified time frame.

(1) Installation of electricity and application procedure

The work of installing the required electricity lines must be completed during the construction works period.

(2) Renovation work on the well and repairing the water supply pipe

The renovation work on the well and the repair of the water supply pipe must be completed during the construction works period.

(3) Planting shrubbery in the compound

The work of planting shrubbery within the compound must be completed during the construction works period.

(4) Obtaining all permits and applications pertaining to the construction works

All permits and applications pertaining to the construction works must be obtained prior to the start of the construction work.

(5) Tax Exemptions

The contractor must obtain tax exemptions of the service tax, value added tax, etc. on all equipment and materials procured in Indonesia pertaining to the Project during the construction works period.

(6) Jetty

1) Dredging in Front of the Jetty

The dredging work in front of the jetty must be completed during the construction works period.

2) Fender

The installation of fender for the Jetty must be completed during the construction works period.

(7) Boat and Mooring Registration

Registration of the boat and mooring rights must be completed during the construction works period.

(8) Obtaining Wireless Radio Communications License

The wireless radio communications license must be obtained during the construction works period.

(9) Payment of B/A commissions to a foreign exchange bank in Japan

A foreign exchange bank in Japan must be selected, the handling fees paid, and authorization of payment must be obtained as soon as possible during the implementation period.

(10) Others

Fill up of access road to the site must be carried out by the Port Authority before the construction works.

3-2 Summary of the Project Cost by the Indonesian Side

(1) Project Cost by the Indonesian Side

The estimated project cost, which will be borne by the Indonesian side is about 338,923,000 Rp and a breakdown of the cost is shown Table 33.

Table 33 Project Cost by the Indonesian Side

	Unit: 10^3 Rp
1) Land reclamation	5,000
2) Installation of electricity lines	36,000
3) Renovation of the well, water pipe repair	36,750
4) Installation of telephone line	544
5) Installation of LPG	10,000
6) Planting shrubbery in the compound	10,000
7) Dredging work	12,600
8) Construction license, permit	127,500
9) Registration fees	7,000
10) Renovation of existing facilities	50,000
11) Others	43,529
Total	338,923

(2) Calculation Factors

The calculations were based on the following factors.

- Period : May 2000
- Exchange rate : 1Rp = 0.0136 yen
- Project implementation period
  : As shown in the Implementation Works Schedule for Project detail design, construction works, and equipment procurement
- Others : The project will be implemented in accordance with the Japanese government grant-aid scheme.

3-3 Operation and Maintenance Plan

The operation and maintenance plan of the Project facilities is shown below.

(1) Utility Costs

1) Electricity cost

A) Basic charge = 1,624,000 Rp./ month × 12 month = 19,488,000 Rp./year
B) Usage charge
・Demand : Rated output (56kw) × Demand ratio (0.5) = Demand(28kw)
・Usage charge = (Demand × Operation hour × day/month × Unit rate × month
= (7,000kw) × 282.5* × 12 = 23,730,000
C) Electricity cost = Basic charge + Usage charge = 19,488,000 + 23,730,000
= 43,218,000Rp.

2) Water cost

The water cost is shared between the users of the facilities who pay 20 percent and the Port Authority, which pays 80 percent. The amount of water consumed was estimated as follows. The annual cost for water is estimated to 220,000 Rp..

Consumption(m^3)	Day/Month	Unit Rate	%	Annual cost (1000Rp.)
2.1	25	1,750	0.2	220

3) Sewage cost

The estimated annual sewage cost was based on sewage collection twice a month by professional services. The annual cost for sewage collection is estimated to 9,720,000 Rp..

Consumption (m^3)	Day/Month	Unit Rate	Monthly cost	Annual cost (1000Rp.)
18	2	22,500	810,000	9,720

4) Gas

The estimated annual gas cost was based on daily gas consumption. The annual cost for gas is estimated to 540,000 Rp..

Consumption (kg)	Day/Month	Unit Rate	Monthly cost	Annual cost (1000Rp.)
3.6	90	500	45,000	540

(2) Communications Cost

The estimated telephone costs of the existing facilities are about 300,000 Rp/month/telephone line. Therefore, the following calculation was made to estimate the annual telephone cost.

300,000 Rp/month telephone line x 2 lines x 12 months = 7,200,000 Rp

(3) Repainting Cost of the Building

As part of the building maintenance and renovation activities, the entire building is repainted once in five years. The cost is 69,567,000 Rp to repaint the facility.

(4) Facilities Repairing and Replacement Costs

Ventilator: The air conditioner unit will be replaced once every 10 years and the annual estimated replacement cost is estimated at 159,700,000 Rp.

In addition, the annual repairing cost has been estimated at 3 percent of the direct installation cost or 5,900,000 Rp.

Light bulbs: The light bulbs for the lighting fixtures will be replaced once every three years at an annual estimated cost of 8,340000 Rp. In addition, replacement costs are estimated at 3 percent of the direct installation cost or 28,400,000 Rp per year.

Water Pump: The water supply pump will be replaced once every five years at an estimated annual cost of 4,600,000 Rp. In addition, replacement costs are estimated at 3 percent of the direct installation cost or 8,910,000 Rp per year.

(5) Equipment

Although there are some items of equipment such as the training vessel with a long durability span, the average durability of the equipment has been estimated at seven years. Therefore, the replacement cost has been estimated at 15,258,495,000 Rp. In addition, repair costs are estimated at 1 percent of the direct installation cost of 66,664,000 Rp per year.

(6) Replacement Costs of Facilities/Equipment

The facilities and equipment that will be provided by the Project will be replaced when their durability span has passed. An estimation of the replacement costs of the equipment and facilities that will need to be replaced within ten years is shown in Table 34.

Table 34 Replacement Cost of the Facilities/Equipment

Main Item	Expected Average Durable year（Year）	Rough Estimation
(1) Air conditioner	10	15,970,000
(2) Pump	5	920,000
(3) Illumination	3	2,780,000
(4) Equipment	7	15,258,495,000

(7) Total Estimated Annual Maintenance Costs

The operations and maintenance costs for the one year of the center is shown in the table below. According to the data shown in Table 35, the annual expenditure of the Project facilities is estimated at 401,531,000 Rp.

Table 35 Annual Cost of Operation and Maintenance

Unit: 10^3 Rp

Category	Total
1. Utility	
- Electricity	43,218
- Potable water	220
- Drainage	9,720
- Gas	540
- Communication	7,200
Sub Total	60,358
2. Maintenance	
- Building Maintenance (once in 5 years)	(69,567)
- Facility Maintenance	
Air conditioner	5,900
Illumination	28,400
Water supply pump	8,910
- Equipment Maintenance	66,664
Sub Total	109,874
(Including Building Maintenance)	(179,441)
3.New Vessel Operation	(Refer to Appendix 6.1.3)
- New Vessel maintenance	22,954
- Mooring of New Vessel	340
- Operation of New Vessel	197,269
Sub Total	220,563
4. Fuel of Bus, etc	(Refer to Appendix 6.4.1) 10,736
Total for one year	401,531
5. Dredging for each 3 years	12,600

Based on the data above, an estimation of the revenue and expenditures of FTDC for the existing and new facilities during the period of 2001 to 2006 when the Project is implemented, is shown in Table 36. According to this estimation, the revenue and the expenditures for the first five years of the center's operations are balanced. However, since the training costs will be covered by the DGF and the beneficiaries of the center, the DGF must allocate the training cost from its development budget.

In reviewing the transitions of the FTDC budget from 1996 to 2006, it is estimated that the increasing budget in 2002 to 2006 will remain at about 30 percent of the budget in 1997 and 1998.

Table 36 Transition in the FTDC Annual Budget

(Unit: 10^3 Rp・year)

Year	1996	1997	1998	1999	2000
Budget	1,595	2,224	2,210	1,826	2,277

Year	2002	2003	2004	2005	2006
Budget	2,807	2,822	2,868	2,847	2,921

In comparison to the budget for 2000, the estimated FTDC budget from 2002 to 2006, when the Project is implemented, will need an approximate increase of 600 to 700 million Rp in the education/training cost and new facilities maintenance cost. FTDC considers to cover this increase from the Annual Fishing Fee and the Skill Development Fund, which is levied from alien workers (Table 37), as a source of budget.

The DGF gained 3,400 million Rp last year from the Skill Development Fund and it was allocated for education and training of each department, and a rise to 5,000 million Rp is expected this year. It is considered appropriate that this rise in the Skill Development Fund covers the increase in the education/ training cost and new facilities maintenance cost of FTDC after the Project implementation.

Table 37 Estimated Revenue and Expenditures of the Semarang FTDC

Unit: 1000 Rp

Item	1st Year	2nd Year	3rd Year	4th Year	5th Year
	2002	2003	2004	2005	2006
Income					
Ordinary Budget(DGF)	2,337,589	2,337,589	2,358,529	2,337,589	2,411,756
Budget for Training(DGF)	469,821	484,861	509,515	509,515	509,515
Tuition	201,352	207,798	218,364	218,364	218,364
Research Fishing (JV)	75,000	75,000	75,000	75,000	75,000
Rent of Seminar Room	2,500	2,500	2,500	2,500	2,500
Sales of Cooperation	2,349	2,349	2,349	2,349	2,349
Fishing by a New Vessel	261,900	261,900	261,900	261,900	261,900
Total	3,350,511	3,371,997	3,428,157	3,407,217	3,481,384
Expenditure					
［Existing Facilities］					
Salary	1,344,493	1,344,493	1,344,493	1,344,493	1,344,493
Management	39,875	39,875	39,875	39,875	39,875
Office Stationery	11,250	11,250	11,250	11,250	11,250
Electricity, Water, Gas, Tel	46,800	46,800	46,800	46,800	46,800
Others	70,500	70,500	70,500	70,500	70,500
Maintenance of Facilities	18,528	18,528	18,528	18,528	18,528
Fuel for Vehicles, etc.	6,400	6,400	6,400	6,400	6,400
Vessels' Maintenance (inc. Mooring)	133,540	133,540	133,540	133,540	133,540
Travel	10,000	10,000	10,000	10,000	10,000
Project Planning	130,000	130,000	130,000	130,000	130,000
Property					
Project Implementation	465,881	465,881	465,881	465,881	465,881
Miscellaneous expenses					
Dredging work			12,600		
［New Facilities］					
Training	671,173	692,659	727,879	727,879	727,879
Electricity, Water, Gas, Tel	60,898	60,898	60,898	60,898	60,898
Maintenance and Management	109,874	109,874	109,874	109,874	179,441
New Vessel's Maintenance	220,563	220,563	220,563	220,563	220,563
Fuel of Bus, etc.	10,736	10,736	10,736	10,736	10,736
Replacement (Facilities, Equipment)			8,340		4,600
Balance	0	0	0	0	0
Total	3,350,511	3,371,997	3,428,157	3,407,217	3,481,384
Budget from DGF	2,807,410	2,822,450	2,868,044	2,847,104	2,921,271

Chapter 4. Project Evaluation and Recommendation

Chapter 4 Project Evaluation and Recommendation

4-1 Appropriate Confirmation, Verification, and Effect

1) Direct effects

By preparing the facilities and equipment for the Project, training for Responsible Fisheries, Fishing Technique, and Nautical Knowledge will be made possible as shown in Table 38

Table 38 Training Contents

Training Category	Short-term Seminar (1-2 days)	Long-term Course (1 week.- 2 months)
1. Responsible fishing	6	5
2. Fishing technique	6	4
3. Nautical knowledge	-	3
Total	12	12

As shown in Table 39, training activities for fishermen will be possible to be carried out for 500 to 560 people annually. Small-scale fishermen constitute 53% of this number, 28% are provincial government staff, and the remaining 19% are expected to be covered by students and trainees from private companies.

Especially, regarding small-scale fishermen, who constitute over half of the trainees (250-320 people/year), practical training with vessels and equipment, previously very difficult, will be possible; thus, training will be greatly improved from the perspective of technical fishermen preparation.

Table 39 Target Number of Trainees

Year	Expected No. of Trainee	Prov. Gov. Staff, Fish Coop. Staff	Small-scale fishermen	Students, Private companies
2002	500	140	255	105
2003	540	165	265	110
2004	560	135	325	100
Avg.	533	147	282	105

After the implementation of the present Project, an average of 147 people from provincial government staff and fishing cooperative members will receive education and training on fishing techniques, including practical training. It is expected that this staff, trained with Responsible Fishing in mind, and with modern techniques, will return to their respective provinces and provide effective fishing training to small-scale fishermen in a cascade-approach (indirect training).

PROTEKAN 2003 aims at providing manpower instruction for modern fishing activities to 230,000 people. If training for small-scale fishermen is conducted at each province in cascade approach after receiving training at FTDC, approximately 10% (approx. 23,000 people) of an target of fisherman training will benefit from improved training in 5 years.

Indirect training:	27 provinces x estimated annual trainees (160)	= 4,320
Direct training:	fishermen (282) + private companies, schools (105)	= 387
Annual direct and indirect trainees		= 4,707
Direct and indirect trainees in 5 years (x 5)		= 23,535

2) Indirect effects

- Increase in employment

An annual number of 250 to 320 small-scale fishermen will be able to acquire fishing techniques of offshore fishing boats through direct practical training, thus improving the employment opportunities.

- Increase in fish catches and income by spreading of fishing techniques

As a result of FTDC's fishing techniques development or diffusion of fishing tools, the fishing community will conduct efficient fishing, improving their income.

- Conservation of fish resources

Under FTDC's training program, education of Responsible Fishing, as promoted by the FAO, will be conducted with special attention, for the maintenance of long-term utilization of marine resources. The reduction and abolishment of unlawful fishing methods, such as the use of dynamites and poisonous substances, will contribute to the protection not only of marine resources but also of the environment.

- Increase in exports

Efficient fishing of small-scale fishermen through improvements and diffusion of fishing techniques, as well as increase of fish catch through the expansion and stimulation of offshore fishing, will lead to an increase in exports, contributing to foreign currency acquisition.

4-2 Recommendation

The present Project is expected to provide an increase in labor opportunities through improvements in fishing technologies of small-scale fishermen, resource preservation, and increase in fisheries products exports. However, after the

implementation of the Project, the following issues and measures regarding operations and facilities maintenance are necessary:

1) The FTDC's training program foresees that 30% of training costs will be covered by the trainees, recruited from all over the country. In order to secure these training costs, it is necessary to recruit the trainees after previously notifying provincial governments and fishing cooperatives on the training contents and effects, securing the participation budget.
2) Teaching staff quality in terms of experience and educational background is high in Indonesian standards, but have little experience as instructors. Therefore, it is necessary to increase the technology and educational methodology for instructors training in order to improve technology and quality of training contents.
3) The present Project plans to have provincial government and fishing cooperatives staff to disseminate fishing technology and resource management to local small-scale fishermen. It is therefore necessary to fully implement dissemination activities of provincial government and cooperatives staff by transmitting them importance of the Cascade Approach (indirect training).
4) The facilities are designed to avoid maintenance and repairs related to ground settlement as much as possible. However, measures against settlement in existing facilities, external pavements, and peripheral infrastructures are absolutely necessary. It is therefore necessary to execute a periodical monitoring of ground settlement and measures against it to all facilities, including surrounding ones.
5) Although Responsible Fishing, with resource management in mind, is stated as part of the training activities of the FTDC, it should have a practical effect on marine resource management. In order to achieve a continuous utilization of these resources, it is necessary to strengthen cooperative relationships, beginning with information exchange, with surrounding nations. Indonesia is currently moving towards its acceptance as a member of Southeast Asian Fisheries Development Centre (SEAFDEC), which would promote the continuous utilization of resources through a more international cooperation.
6) In order to increase the effectiveness of the training program after the preliminary preparations of the facilities and equipment, it is valuable to implement technical cooperation on the FTDC's operations, such as establishment of training plans, execution of practical training, and evaluation. Although short-term Japanese experts, or senior volunteers, are currently planned to be dispatched, it is advisable

to implement the project’s operations based on coordinated techical cooperation centered on long-term experts already dispatched.

Appendix

Appendix 1. Members of the Study Team

Basic Design Field Survey

Mr. TAGUCHI Hiroto	Team Leader	Fisheries Processing Industries Div., Fisheries Policy Planning Dept., Fisheries Agency, MAFF
Mr. NAITOU Tomoyuki	Coordinator	Project Coordination and Monitoring Div. Grant Aid Management Dept., JICA
Mr. DATE Yukitaka	Project Manager, Architectural Planner	System Science Consultants Inc.
Mr. KONDO Kozo	Facilities Planner / Natural Condition Survey	System Science Consultants Inc.
Mr. KAWAMOTO Taro	Equipment Planner I	Kyokuyo Co., Ltd.
Mr. SEKI Takehide	Procurement / Cost Estimator	System Science Consultants Inc.

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Mr. SUZUKI Shintaro	Team Leader	Marine Resources & Environment Div., Fisheries Agency, MAFF
Mr. MUROTANI Ryutaro	Coordinator	Fourth Project Management Div. Grant Aid Management Dept., JICA
Mr. DATE Yukitaka	Project Manager, Architectural Planner	System Science Consultants Inc.
Mr. KONDO Kozo	Facilities Planner / Natural Condition Survey	System Science Consultants Inc.
Mr. KAWAMOTO Taro	Equipment Planner I	Kyokuyo Co., Ltd.

Work in Japan

Mr. ORIHARA Shuji	Equipment Planner II	Kyokuyo Co., Ltd.

Appendix 2. Survey Schedule

Basic Design Field Survey

No.	Day	Week	Official	Project Manager / Architectural Planning	Facilities Planning / Natural Condition Survey	Equipment Planning / Fisheries Training	Construction and Procurement Planning / Cost Estimation
1	19-Jan	Wed	Narita→Jakarta(JAL725 10:55-16:25)		←	←	←
2	20-Jan	Thu	Courtesy Call to E/J and JICA Office, Courtesy Call to Government of Indonesia(MOA), DGF		← Preparation of Natural Condition Survey	←	←
3	21-Jan	Fri	Discussion with DGF (Explanation of Inception Report, Delivery of Q/A: Training Needs		←	←	Discussion with DGF, Construction Procurement Survey(Delivery of Q/A for Construction)
4	22-Jan	Sat	Jakarta→Semarang(GA232 10:00-11:00), Site Survey(Old Center, Vessels), Discussion with FTDC		←	←	←
5	23-Jan	Sun	Site Survey, Inspection of Previous Center and Existing Vessels		Inspection of Fishing Port, Natural Condition Survey (Boring, Land Survey and Existing Metric Survey)	Inspection of Fishing Port, Fishing Vessels, Inspection of Previous Center and Vessels	Same as P/M
6	24-Jan	Mon	Discussion with FTDC(Maintenance and Operation Budget)		Natural Condition Survey (Supervising of Field Work), Discussion with Port Authority, Tide station	Discussion with FTDC, Discussion with DGF and Fisher man Organisation (Object, Need), Inspection of Vessels	Discussion with FTDC, Construction Procurement Survey in Semarang (Construction company)
7	25-Jan	Tue	Discussion with FTDC (Training Plan, Facilities equipment), Semarang→Jakarta(GA235 17:00-18:00)		Natural Condition Survey (Supervising of Field Work), Wave condition)	Interview and Q/A to Fish company (Training Target and Need)	Construction Procurement Survey(Material shop)
8	26-Jan	Wed	Courtesy Call to BAPENAS, Discussion with DGF(Minutes of Meeting),		Natural Condition Survey (Supervising of Field Work)	Discussion with FTDC(Training Curriculum, Vessel Operation)	Construction Procurement Survey(Gravel and sand, Concrete Plant)
9	27-Jan	Thu	Signing of Minutes of Meeting		Natural Condition Survey (Supervising of Field Work), Discussion with FTDC(Training Plan)	Discussion with FTDC(Training Curriculum,	Infrastructure (Electricity, Water, Sewer and Telephone)
10	28-Jan	Fri	Report to E/J and JICA Office Jakarta(JAL726 23:45-)	Report to E/J and JICA	Natural Condition Survey (Supervising of Field Work), Discussion with FTDC(Training curriculum)	Discussion with FTDC (Training Curriculum, Equipment)	Regulation and application for construction (Local government, PWD, Port Authority
11	29-Jan	Sat	→Narita(8:35)	Jakarta→Semarang (GA23 10:20-11:20), Team Meeting	Natural Condition Survey, Meeting	Team Meeting	←
12	30-Jan	Sun		Natural Condition Survey (Supervising of Field Work), Data Analysis	←	Data Analysis	Data Analysis
13	31-Jan	Mon		Discussion with FTDC (donor) and Port Authority	Natural Condition Survey (Supervising of Field Work), Interview Survey surround	Interview Survey in Tega Fisheries Office, Pekalong and Batang Fisheries Coop.(Training Need)	Interview Survey (PWD, Authority)
14	1-Feb	Tue		Discussion with FTDC (Training plan), Inspection Simmler Facilities(Maritime Academy)	←	←	Construction Procurement Survey (Material shop, contractor
15	2-Feb	Wed		Discussion with FTDC (Budget, Maintenance Co	Natural Condition Survey (Supervising of Field Work), Preparation of Facilities Pl	Same as P/M	Construction Procurement Survey (Material shop, contractor
16	3-Feb	Thu		Discussion with FTDC (Training Plan, Facilities equipment)	Natural Condition Survey (Supervising of Field Work), Discussion with FTDC	Same as P/M	Semarang→Jakarta(GA231 8:40-9:40), Data Analysis
17	4-Feb	Fri		Discussion with FTDC (Priority of Facilities and Equipment)	Natural Condition Survey , Discussion with FTDC	Same as P/M	Construction Procurement Survey (Piling Contractor)
18	5-Feb	Sat		Discussion with FTDC (Facilities and Equipment),Inspection of yard and vessels	←	←	Construction Procurement Survey (Collection of Q/A)
19	6-Feb	Sun		Semarang→Jakarta(GA233 12:00-13:00), Data Analy	Data Analysis	←	Data Analysis in Jakarta
20	7-Feb	Mon		Discussion with Fisheries Education and Training Section (MOA)	Natural Condition Survey , Collection and Interview fr Provincial Office	←	Discussion with MOA, Construction Procurement Survey (Material shop, Contractor)
21	8-Feb	Tue		Data Collection from DGF	Natural Condition Survey , Collection	Data Collection from DG Procurement Survey (Ja Agent)	Construction Procurement Survey (Construction)
22	9-Feb	Wed		Discussion with DGF(Fa and Equipment, Budget Source)	Natural Condition Survey , Collection	Discussion with DGF(Fa and Equipment, Budget Source), Interview from Industrial Company	Construction Procurement Survey(Collection of Q/A Construction)
23	10-Feb	Thu		Data collection, Report t and JICA Office	Semarang→Jakarta(GA231 8:40-9:40), Report to E/J JICA Office	Same as P/M	←
24	11-Feb	Fri		Jakarta(JL726 23:50-)	←	←	←
25	12-Feb	Sat		→Narita(-8:35)	←	←	←

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No. of Date	Day	Week	Offical	Project Manager / Architectural Planning	Facilities Planning / Natural Condition Survey	Equipment Planning for Fisheries Training
1	21-May	Sun	Narita-Jakarta （JAL725 10:55-16:25)	←	←	←
2	22-May	Mon	Courtesy call to E/J, JICA and BAPPENAS, Meeting with DGF	←	←	Semarng-Jakarta(GA230 7:00-8:00), Meeting for Equipment Spec. with FTDC
3	23-May	Tue	Jakarta-Semarng(GA230 7:00-8:00), Meeting with FTDC	←	←	Meeting for Equipment Spec. with FTDC
4	24-May	Wed	Meeting with FTDC, Semarng-Jakarta(GA235 15:20-16:20)	←	Interview (Public Woerks in Semarang), Semarng-Jakarta(GA235 15:20-16:20)	Meeting for Equipment Spec. with FTDC
5	25-May	Thu	Meeting with DGF	←	←	Meeting for Equipment Spec. with FTDC, (GA235 15:20-16:20)
6	26-May	Fri	Signing of Minutes of Meeting, Reporting to E/J and JICA, Jakarta-(JAL726 23:50-)	←	←	←
7	27-May	Sat	Narita(-8:35)	Additional survey(Contractor, Material shop),	←	←
8	28-May	Sun		Data analysis	←	←
9	29-May	Mon		Additional survey (Classification of vessel, Cirtificate), Jakarta-(JAL726 23:50-)	Additional survey (Contractor, Material shop), Jakarta- (JAL726 23:50-)	Additional survey (Classification of vessel, Cirtificate), Jakarta-(JAL726 23:50-)
10	30-May	Tue		Narita(-8:35)	←	←

Appendix 3. List of Party Concerned in the Recipient Country

Basic Design Field Survey

Ministry of Sea Exploration and Fisheries
Directorate General of Fisheries

Untung Wahyono	Director General

Directorate of Planning

Sjarif Osman Maksoem	Director
Enni Soetopo	Chief of Program Cooperation Sub-directorate
Rahmah Hayati	Chief of Technical Assistance
Asep Suryana	Program Cooperation Sub-directorate
Eddy Sudartanto	Statistics Sub-directorate
Bambang Wahyudi	Chief of Program Preparation Sub-directorate

Directorate of Production and Development

Gomal Tampubolon	Chief of Fishing Development Sub-directorate
Suprapto	Fishing Development Sub-directorate

Directorate of Fisheries Enterprise & Processing

Djuko Martuyo	Fisheries Enterprise Sub-directorate

Directorate of Fisheries Resource Management

Bambang Edi Priyono	Chief of Potential Analysis of Fisheries Resource Management
Elia Suwardi	Potential Analysis of Fisheries Resource Sub-directorate

Semarang Fishing Technology Development Center

Suharyadi Salim	Director
Zarochman	Professional staff, Resources environmental engineering
Agung wahyono	Professional staff, Fishing technology engineering
Tapsirin	Professional staff, Fishing vessel operation

Syahas Dwinanto Gautama	Professional staff, Marine machinery & electrical for fisheries vessel

Agency for Agricultural Education and Training

Suryaman Tarden	Director Bureau for Agricultural Education

National Planning Board (BAPPENASS)

Gellwynn Jusuf	Head of Biro Pertanian dan Kehutana

Port of Tanjung Emas Semarang（PERINDO）

Ir. Adji Pamungkas	Branch Manager
M.Harry Subagio	Marine Engineer

Semarang Marchant Maritime Academy

Capt. Sulistiyo	Vice Principal

Embassy of Japan in Indonesia

Hideki Wakabayashi	Secretary

JICA Indonesia Office

Kazuhiro Yoneda	Deputy Resident Representative
Takayuki Sahara	Deputy Resident Representative
Takeshi Watanabe	Assistant Resident Representative

JICA Expert

Sadayuki Oka	JICA Expert

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Ministry of Sea Exploration and Fisheries

Directorate General of Fisheries

Untong Wahyono	Director General
Nanan Rudayat	Secretary of the Directorate General
Sugiri Elon	Director of Production
Sri Haria	Director of Seed Development

Sjarif Osman Maksoem	Director of Fisheries Resource Management
Bambang Wahyudi	Chief of Program Preparation Sub-directorate
Enni Soetopo	Chief of Program Cooperation Sub-directorate
Gomal Tampubolon	Chief of Fishing Development Sub-directorate
Rahmah Hayati	Chief of Technical Assistance

Semarang Fishing Technology Development Center

Suharyadi Salim	Director
Zarochman	Professional Staff (Resources environmental engineering)
Agung Wahyono	Professional Staff (Fishing technology engineering)
Tapsirin	Professional Staff (Fishing vessel operation)
Syahas Dwinanto Gautama	Professional Staff(Resources environmental engineering)

Public Work Institution

Budi Sulistyo	Chief of Development section

Bureau for Food, Agriculture and Water resource
National Development Planning Agency (BAPPENAS)

Joyo Winoto	Bureau Chief
Ning Darajati	Foreign Cooperation

Embassy of Japan in Indonesia

Hideki Wakabayasi	Secretary

JICA Indonesia Office

Kazuhiro Yoneda	Deputy Resident Representative
Takeshi Okoda	Assistant Resident Representative

JICA Expert

Nobuyuki Horikoshi	JICA Expert