JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
THE MINISTRY OF COMMUNICATIONS,
THE REPUBLIC OF INDONESIA

No. 2

BASIC DESIGN STUDY REPORT
ON
THE PROJECT FOR IMPROVEMENT OF
THE BAROMBONG RATING SCHOOL
IN
THE REPUBLIC OF INDONESIA

December, 1994

NIPPON TETRAPOD 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 the Improvement of the Barombong Rating School and entrusted the study to the Japan International Cooperation Agency(JICA).

JICA sent to Indonesia a study team headed by Prof. Fujio Kuroda, Chairman, Department of Navigation, Institute for Sea Training, and constituted by members of Nippon Tetrapod Co., Ltd., from July 4 to August 11, 1994.

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 report, 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.

December, 1994

Kimio Fujita
President
Japan International Cooperation Agency

December, 1994

Mr. Kimio Fujita,
President
Japan International Cooperation Agency
Tokyo, Japan

Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for the Improvement of the Barombong Rating School in the Republic of Indonesia.

This study was conducted by Nippon Tetrapod Co., Ltd., under a contract to JICA, during the period July, 1994 to December 28,1994. 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.

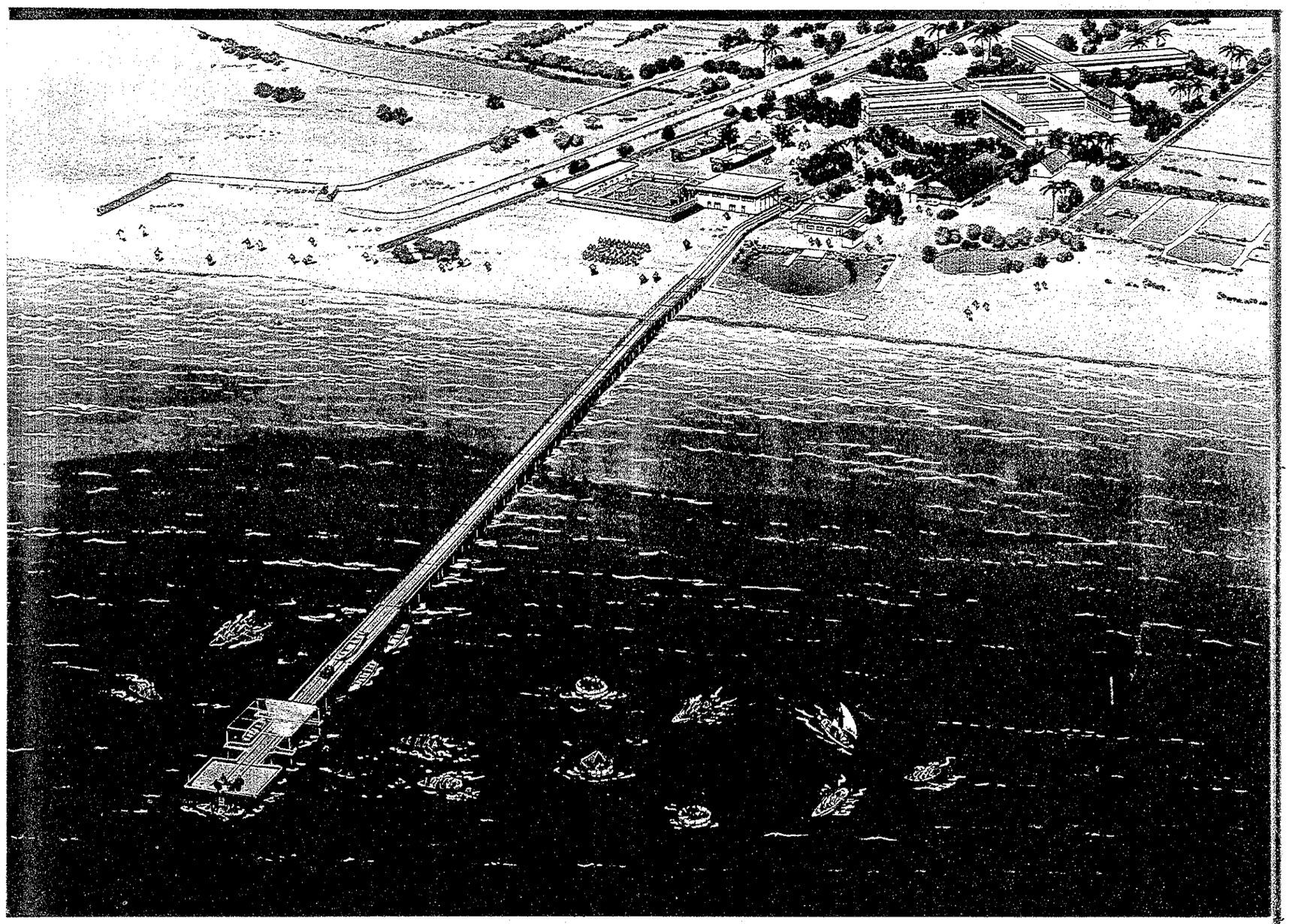
We wish to take this opportunity to express our sincere gratitude to the officials concerned of JICA, the Ministry of Foreign Affairs, and Ministry of Transport. We would also like to express our gratitude to the officials concerned of Education and Training Agency, Ministry of Communications, the JICA Indonesia office, the Embassy of Japan in Indonesia for their cooperation and assistance throughout our field survey.

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

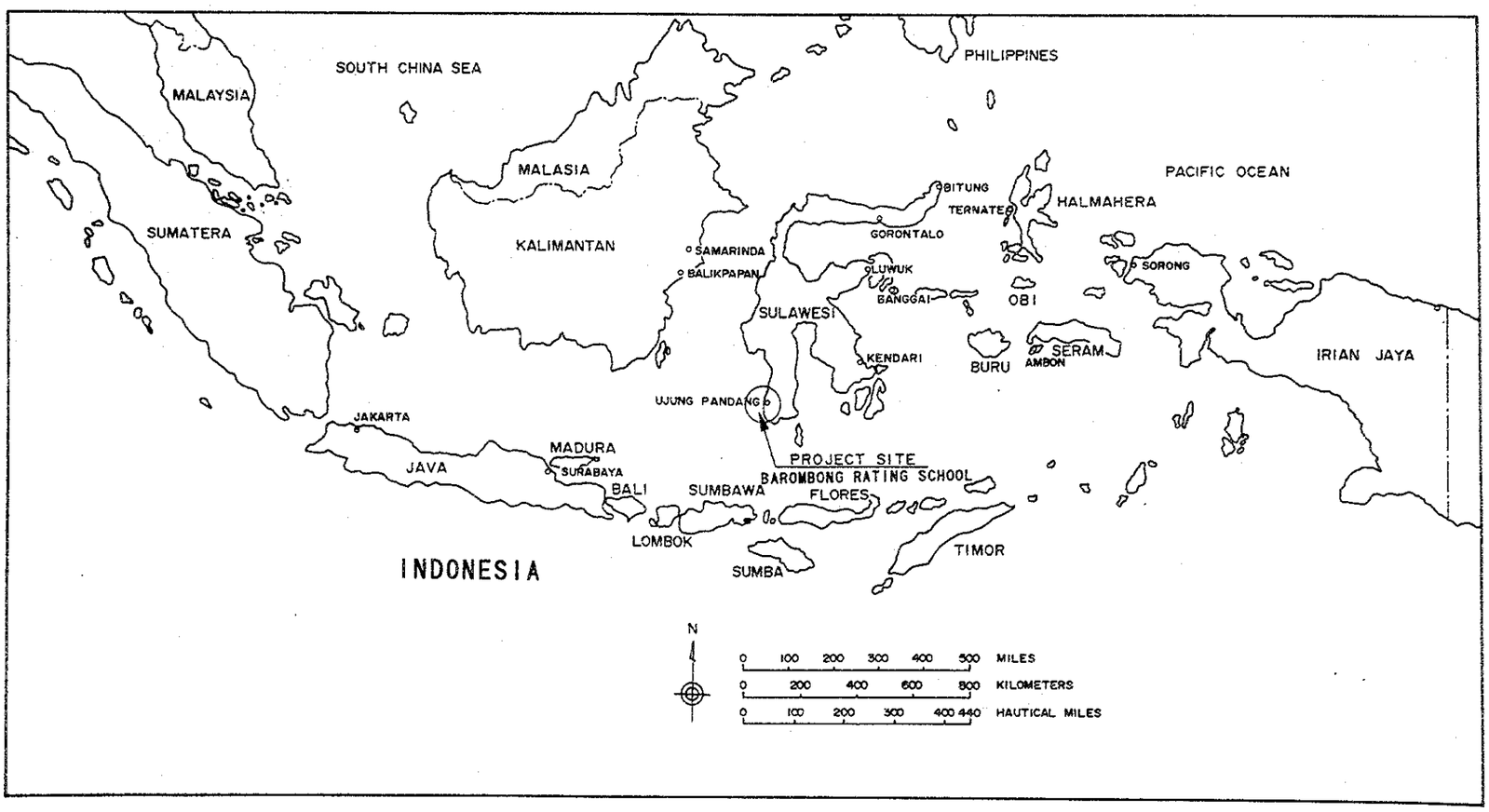
Very truly yours,

Taiji Endo

Taiji Endo
Project manager,
Basic design study team on the Project for
the Improvement of the Barombong Rating School
Nippon Tetrapod Co., Ltd.



LOCATION MAP OF THE BAROMBONG RATING SCHOOL



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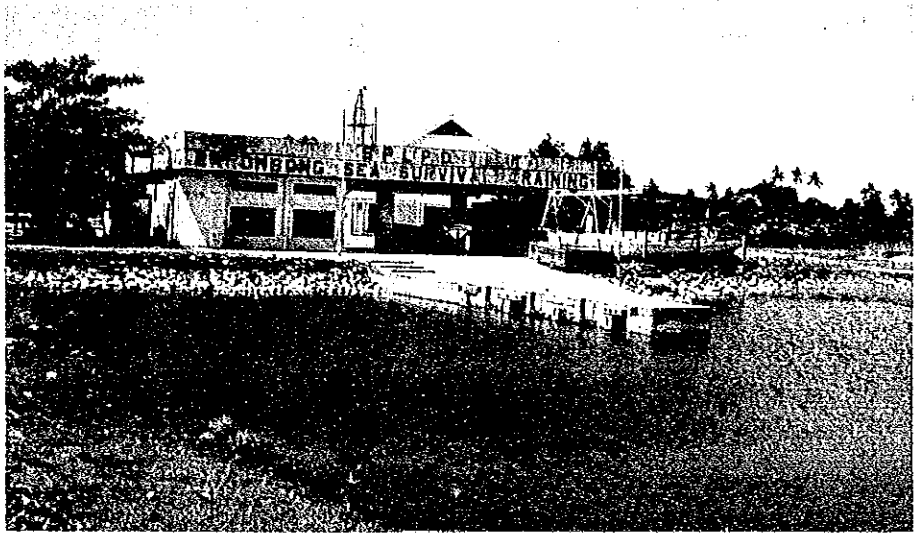

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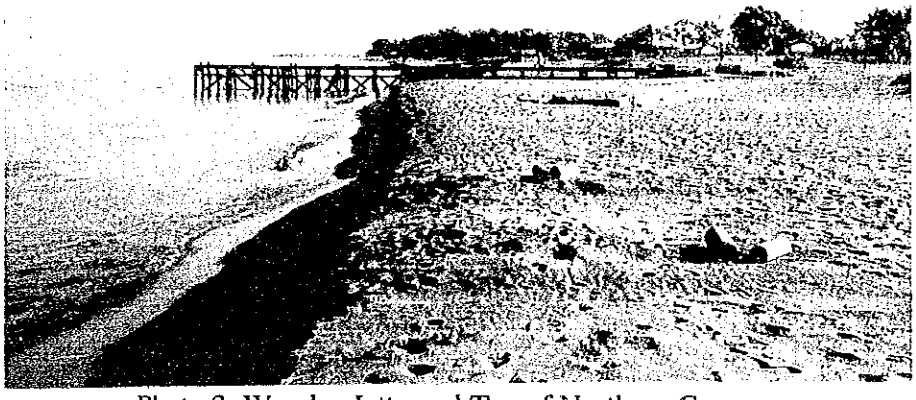

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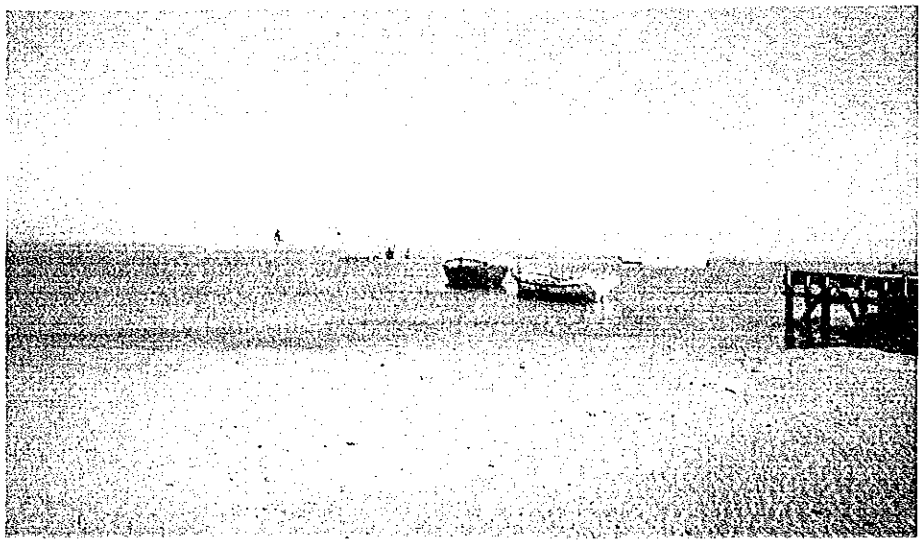

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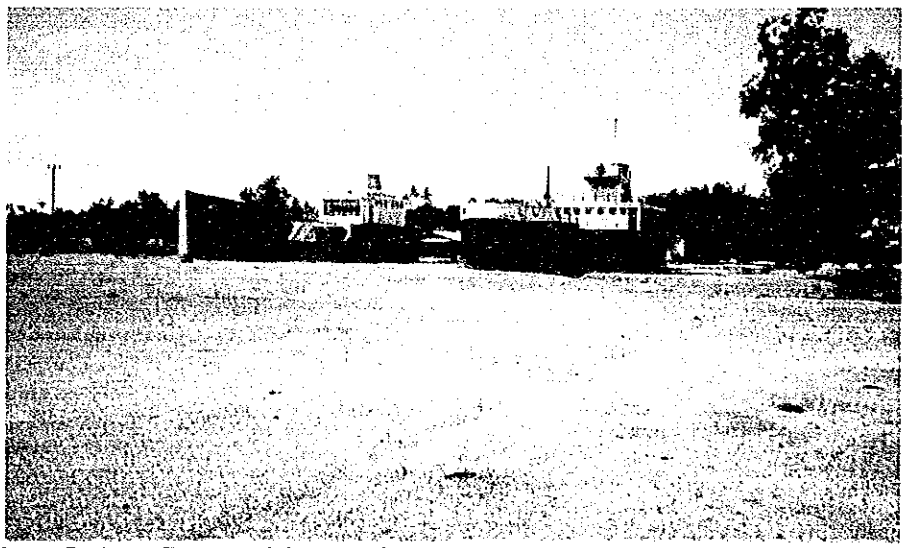

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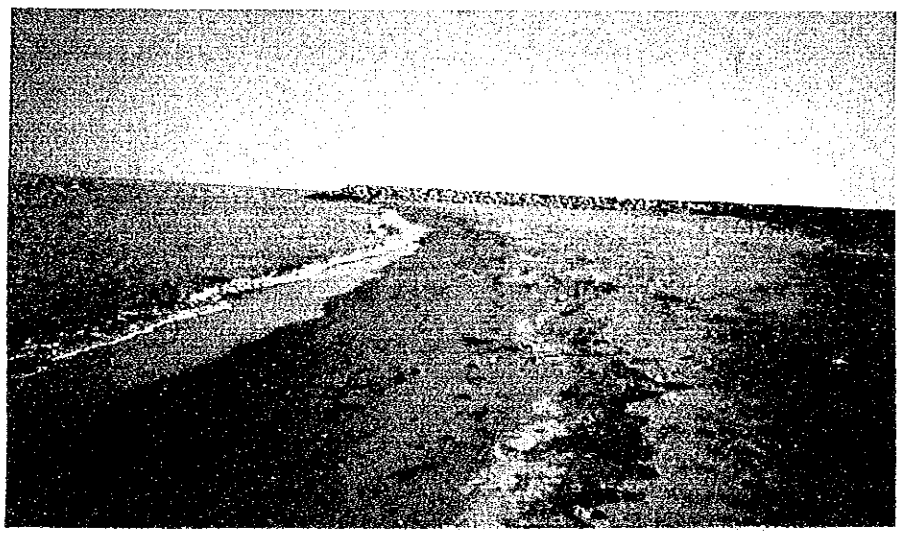

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Summary

Summary

Sea transportation plays a important and vital role for the Republic of Indonesia which consists of some 13,000 islands. Hoping to improve this important means of transportation, Indonesia has drawn the Maritime Sector Development Programme and the Integrated Sea Communications Manpower Developing and Training Master Plan under its 5-year Economic Development Programme, to thereby achieve qualitative and quantitative improvement of seaman. In 1986, Indonesia ratified the STCW Convention, "The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers', 1978", and is currently improving its educational and training levels of seamen and facilities to implement the training required by the Convention.

The Barombong Rating School is located in the suburbs of Ujung Pandang City in South Sulawesi. The School was completed in March, 1980 with the Japanese grant aid cooperation for training of seamen, and opened in June of the same year, as Indonesia's first rating school for seamen. Under the grant aid, all of the basic facilities for the School were provided including the main building, the training facilities, the boat house, the breakwater, the slipway, and educational facilities and equipments such as cargo handling equipments and life boats. With coming into effect of the STCW Convention in 1984, further improvement, expansion and modernization of the training facilities and equipments became necessary, and Japanese government complied with the second request for grant aid by providing machinery and equipments for navigation aid, survival training and fire-fighting training, equipments for deck department and engine department, and construction of a training building and a jetty.

The School had been conducting the cutter training and the survival training as required by the STCW Convention in the groyne surrounded by the breakwater, which became buried by large-scale littoral drifts supplied from the Jeneberan River located on the north side of the School, presenting great difficulties in training. In order to further expand and improve the School as well as education and training of Indonesian seamen, the Government of Indonesia has requested Japan's assistance for this Project to construct the essential facilities for the said trainings. After verifying the validity of the requests by the Preliminary Study Mission in 1993, the Japanese Government organized and dispatched the Basic Design Study Team to conduct site investigations for 40 days from July 4 to August 12, 1994. The Draft Presentation Study Team was dispatched from November 29 to December 5, 1994 to present the proposed plan based on the draft final Report.

The basic policy for the Project was to facilitate the cutter training and the survival training required under the STCW Convention, which are now being hindered by immersion of the groyne by littoral sand. The groyne had been located on a sandy coast with considerable littoral movements and suffered from unforeseen sedimentation since its completion in 1980. Despite continued efforts for maintenance and restoration by dredging, the School was forced to give up its use because of voluminous sedimentation. A 30-meter wooden jetty constructed as an alternate facility by the second grant aid is also not functioning currently because of obsoleting and the shallow depth at the top caused due to severe sedimentation.

In view of the above and as a result of consultation with the Indonesian Government, the followings were requested by the Indonesian Government.

(1) Construction of a new jetty for cutter training.

(2) Construction of a new boat house.

(3) Construction of survival training pool and related facilities.

(4) Re-formation of the existing boat house for lecture room.

(5) Installation of transportation facility of cutter boat including launching devices.

(6) Installation of boat davit and jumping platform on the pool and provision of open type life boat.

The present study was conducted to study the basic design for improving the Barombong Rating School in accordance with these requests and to evaluate the validity of the Project for receiving a grant aid by gaining full knowledge of the background and content of the Project, the natural conditions, the operating organization, the system for maintenance and supervision, and the background situation regarding construction through the site investigations and examination in Japan. Other objects of the study were to perform the basic design in order to establish the optimum contents and the scope required for implementing the aids, to estimate the project costs and evaluate the effectiveness of the project. The basic design in respect of the following facilities were prepared for the grant aid based on the study.

* Cutter Training Facility

Jetty length:	310 m (including 63 m for the berthing portion)
Crown height:	D.L. +4.3 m
Crown width:	5.0 m

Structural style:	Steel pipe pile type jetty
Auxiliary facilities:	Turning platform for boat carrier and tractor, bits, light beacons, gate, etc.

* New Boat House

Area:	480 m2 (20.0 m x 24.0 m)
Capacity:	Four (4) cutter boats or life boats
Auxiliary facilities:	Repairing spot for hull bottom (84 m2), overhead crane (manual), supply, storage, etc.

* Survival Training Facility

Pool area:	625 m2 (25.0 m x 25.0 m)
Depth:	−1.5 m and −4.0 m
Apron width:	7.0 m
Capacity:	One class (35 to 40 students)
Auxiliary facilities:	Locker room, shower/toilet, storage, water purifier device, water supply, etc.

* Reformation of Existing Boat House to Lecture Room

Area:	303.75 m2 (Roof area: 13.5 m x 22.5m)
Capacity:	One class (35 to 40 students)
Auxiliary facilities:	Toilet, lighting, etc.

* Cutter Boat Transportation Facility

Boat Crane:	Manual type boat crane to be installed at the top of the cutter training facility to lift and launch cutter boats and life boats
Approach Road:	Road to connect the cutter training facility and the new boat house
Rails:	Rails for boat transportation to be laid on the cutter training facility and the approach road
Transport facility:	Tractor, boat carrier for the boats, suspender, boat racks

*Equipments

Open type engine life boat
Jumping platform, davit for life boat for the survival training facility
Video system for the lecture room converted from the existing boat house

It is estimated that the present Project will take 3 months for the implementing detail design and 12 months for the construction. Indonesia is responsible for investigating the ground water resource survey and drilling a new well for the survival training facility.

The Education and Training Agency of the Ministry of Communications, the Republic of Indonesia will carry out the project and be responsible for management and

maintenance of the project facilities. As this organization has experienced the past two Japan's grant aid projects for the Barombong Rating School and as guidance from JICA experts is also available, we foresee no problems in management and operation of the facilities under this Project. The School so far has received annual increases of budget for maintenance and operation, and here also we see no problems in budgetary or human resources regarding maintenance of the proposed facilities after completion.

As regards environmental issues, special care was taken to protect the natural environment by adopting a pile type jetty structure to minimize the influences on the littoral drift and consequently on the surrounding sandy beaches in view of the fact that the proposed site for the cutter training facility lies in the coastal area where littoral drifts are routinely observed.

Following effects are perceived by implementation of the present Project.

(1) The Barombong Rating School plays a central role in the Island of Sulawesi and East Indonesia, and improvements made to the School under this Project will most likely influence other marine academies and rating schools as a model for seamen's education which meets requirements of the STCW Convention, and contribute to raising the levels of seamen's education in Indonesia. Improvement to the education and training levels and capacity to be realized by this Project and diffusion of navigation skills which are internationally recognized by the STCW Convention are essential for development of marine transport industry in Indonesia, and will help achieving the targets of long term development plans such as "Maritime Sector Development Programme", "Integrated Sea Communications Manpower Development and Training Master Plan" under the 5-Year Economic Development Plan.

(2) When completed, the cutter training facility will facilitate safe transport, launching, and lifting of cutter boats and life boats, to thereby realize efficient education and training. Training items required by the STCW Convention will be practicable in conditions simulating actual situations.

(3) The new boat house will facilitate carrying in and out of the life boats and the

cutter boats to and from the cutter training facility and the survival training facility. Improved work performance due to the improved storage conditions and the repair space will help extending durability of the boats.

(4) The School is forced to conduct the survival training in the sea because the existing groyne cannot be used, but the training is often difficult or impossible during the monsoon period with seasonal strong wind and severe wave. With the completion of an exclusive facility, the training can be given safely at any time, and with installation of the davit for life boats and the jumping platform, the items required by the STCW Convention for survival training will be met.

(5) As the existing boat house is not functioning because of siltation of the groyne will become redundant once the new boat house is built, it will be converted into a lecture room to accommodate the rapid increase of students, thus putting the existing facility to a good use.

(6) Both the cutter boats and life boats currently in possession of the School are obsolete. By offering a open type engine life boat, safety of training can be improved and the training for launching boat safely onto the water can be performed.

As discussed above, the current situation at the Rating School calls for immediate remedial action for difficulties faced by its cutter training and survival training due to siltation of the groyne, the training is required by the STCW Convention. The Project is judged valid and significant in view of its urgency, degree of effectiveness, nature of the plan and prospect for maintenance and operation of the facility.

CHAPTER 1

BACKGROUND OF THE PROJECT

CHAPTER 1 BACKGROUND OF THE PROJECT

1-1 Background of the Project

Sea transportation plays a important and vital role for the Republic of Indonesia which consists of some 13,000 islands. The country hopes to improve the sea transportation under the Indonesia Issues and Policy Options named Repelita V (1990 – 1994) in view of its crucial importance as well as for education and training of the seamen.

The Barombong Rating School (formerly Ujung Pandang Rating School) is located in the suburb of Ujung Pandang City in the Province of South Sulawesi. The School was completed in March, 1980 with the Japanese grant aid cooperation for training of seamen and opened in June of the same year as the Indonesia's first rating school for seamen. It has a floor area of approximately 7,000 m2 for various facilities on an ground area as large as about 627,000 m2, and offers education and training to interisland and near coastal seamen, and re-education programs to those in active service. With obsoleting of training facilities and coming into effect of the 1984 STCW Convention, "The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers', 1978", the need for modernization, improvement and expansion of the training and educational facilities, resources and equipments became acute. The Government of Indonesia thus requested the Government of Japan to provide a grant aid for the second time for expanding and improving the School facilities. Responding to this request, Japan offered the grant aid in 1987 to provide equipments for navigation aid, survival training, fire-fighting, deck department and engine department as well as the practical training building and the jetty.

The life boat and cutter boat training is performed as a part of survival training in the School, but the use of calm waters and the facilities and equipments for cutter training became impossible as the groyne (the basin for small crafts) for launching cutters and the access road were buried by sand drift from the estuary of the Jeneberan River located at 1 km north of the School.

The Government of Indonesia requested the Government of Japan to build facilities for the cutter training and the survival training in order to further improve the School and education and training in general for the seamen of Indonesia. In response to this request, Japan dispatched a preliminary study team in 1993 in order to study the validity of Indonesia's requests by consulting with the Indonesian Government and investigating the

actual situation of trainings and the natural conditions. As the validity of the Japanese aid was recognized, it was decided to conduct the present basic design study. The Education and Training Agency of the Ministry of Communications, the Republic of Indonesia will carry out the project.

1-2 Outline of the Request and Main Components

The objective is to formulate an improvement plan for efficient implementation of the cutter training and the survival training which is currently hindered by siltation of the groyne by littoral drift. These trainings are important parts of the program required under the STCW Convention.

The basic study mission had consultations with the Indonesian counterpart and confirmed by the minutes of the meeting the requests for the following facilities and equipments for the cutter training and the survival training.

(1) Construction of a new jetty for cutter training.

(2) Construction of a new boat house.

(3) Construction of survival training pool and related facilities.

(4) Re-formation of the existing boat house for lecture room

(5) Installation of transportation facility of cutter boat including launching devices.

(6) Installation of boat davit and jumping platform on the pool and provision of open type life boat

Indonesia will conduct a ground water resource survey, will drill a new well for the survival training facility.

1-3 Project and/or Program of Other Donors

Although the School receives donations from shipping companies for re-educating their seamen, there are no prospects for aids from international organizations or countries other than Japan which has given the grant aids twice in the past.

CHAPTER 2

OUTLINE OF THE PROJECT

CHAPTER 2 OUTLINE OF THE PROJECT

2-1 Objectives of the Project

The project aims to improve the cutter training and the survival training, which is a part of the training courses designated as essential for the rating schools by the STCW Convention and which became impossible to implement because the training facility of the groyne is isolated in the beach due to severe sedimentation.

2-2 Study and Examination of the Request

The existing groyne was constructed by Japan's first grant aid for the School, but it became buried by excessive siltation which started immediately after the construction despite restoration efforts by dredging works. Currently, the shoreline is situated on the offshore side of the breakwater, the protective facility for the groyne, isolating the facility amid the sandy beaches. As restoration and maintenance of the groyne by dredging were considered most difficult, alternative facilities for the cutter training and the survival training were judged as necessary.

The details of the facilities requested and the outline of the study results are given as follows.

(1) Cutter Training Facility

The most practical construction for the cutter training facility is a jetty type which would not hinder the littoral drifts or the flow of coastal current. The facility will be sited offshore and onshore, and therefore should have the minimum equipments. Electric facilities and complex machinery except for lights and light beacons will not be considered and cutter boats and life boats will be launched, as a rule, by manual operation.

(2) New Boat House

With the change in the cutter training facility, use of the existing boat house located in the back of the groyne will become impossible, requiring a new boat house. The site is adjacent to the survival training facility to facilitate transport of cutter boats and life boats.

(3) Survival Training Facility

Although survival training would be more practical if performed around the cutter training facility, it was judged that a land facility should be built in order to secure the safety of beginners and because of a need for a simple facility for the cutter training.

A proposal to construct the facility within the buried groyne area was rejected because it was considered inappropriate to build it on the side of the sea beyond the original shoreline which existed at the time the School was opened, and also because the construction cost would be more expensive and the shoreline may possibly recede further in the future. It was therefore decided to secure the construction site on the side of the land from the original shoreline.

A jumping platform and a life boat davit will be equipped. A overhead crane connected to the new boat house will be installed to lift and launch a life boat or a cutter boat directly onto the pool. Related facilities such as the dressing room, shower and toilet room, storage and water purifier device as well as apron with a sufficient width will be provided.

Fresh water from the existing deep well in the compound will be restored and supplied to the facilities since the use of the sea water will create difficulties in maintenance. It was agreed that Indonesia will be responsible for investigation of the ground water resources and drilling a new well.

(4) Reformation of the Existing Boat House

The existing boat house on the shore is used partly as a lecture room for survival training. After the new boat house is completed, it will be converted to a full lecture room accommodating a class of 35 to 40 students and will have an exhibit space for training equipments.

(5) Cutter Boat Transportation Facility

There will be installed a launching device at the tip of the cutter training facility for easy handling and transporting cutter boats and life boats from the facility to the boat house.

And a overhead crane to handle inside of the boat house and to transport boats to the survival training pool will be installed in the new boat house.

An approach road will also be constructed to connect the cutter training facility and the new boat house. The rails will be installed for easy and safety transport of boats between the cutter training facility and the boat house.

The equipments for transportation of the boats such as boat carrier, tractor and suspenders will be considered.

(6) Equipments

An open type engine life boat will be offered to replace the now obsolete boats. A davit for life boats and a jumping platform will also be provided for the survival training facility.

The proposed facilities as above outlined are based on the basic policy and are necessary and sufficient for the cutter training and the survival training under this Project. The Project is feasible in respect of the natural condition and the site conditions, and there will be no problems for use or maintenance after the facilities are completed.

It was judged that implementation of this Project with Japan's grant aid is valid because its effects, practicality and capacity of the recipient country were confirmed by the above study and because the effect of this Project meets the objective of Japanese grant aid cooperation program. We shall therefore review the project and carry out the basic design, assuming the grant aid would be available. As discussed in relation to the components of the Project and the requested facilities and equipments, we believe it appropriate to modify the request in part.

2-3 Project Description

2-3-1 Operational Structure

Fig. 2-3-1 shows the organization of the Barombong Rating School with a total of 86 personnels.

As the facilities included in the Project will be easy to maintain, only a few persons will be additionally needed for the job, and the current personnel will suffice to address the requirements. The School has 86 members on the staff, quite sufficient for management of the facilities.

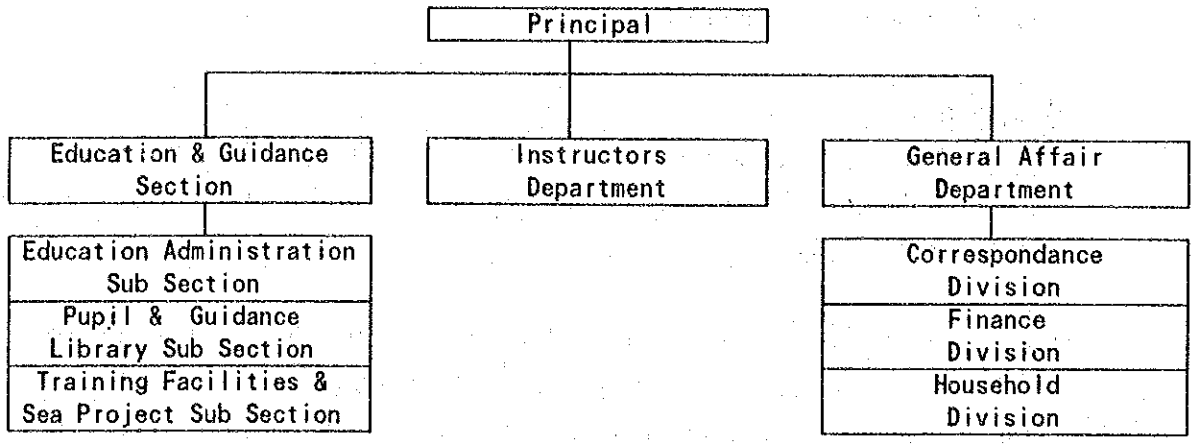


Fig. 2-3-1 Organization of Barombong Rating School

2-3-2 Activities of the School

(1) Education and Training Curricula

The School was first opened to offer opportunities for re-training for seamen in active duty, but it started a general training course for international ratings and interisland officers to secondary school graduates in January, 1984. Table 2-3-1 shows the details of the training for the regular courses and the certifications for which students qualify.

The School opens its doors wide to all those who wish to become seamen and those in active duty who wish to receive re-education.

Table 2-3-1 Curriculum for Regular Courses

Course	Competence Certification	Subjects of training
PD-1	SKP	Ratings of deck and engine dept.
PD-2	MPT / JM	Near coastal officers
PD-3	MPI / AMK-IS	Interisland officers

The curricula for the regular and the special courses and the number of students for the first semester and the prospective number of students for the

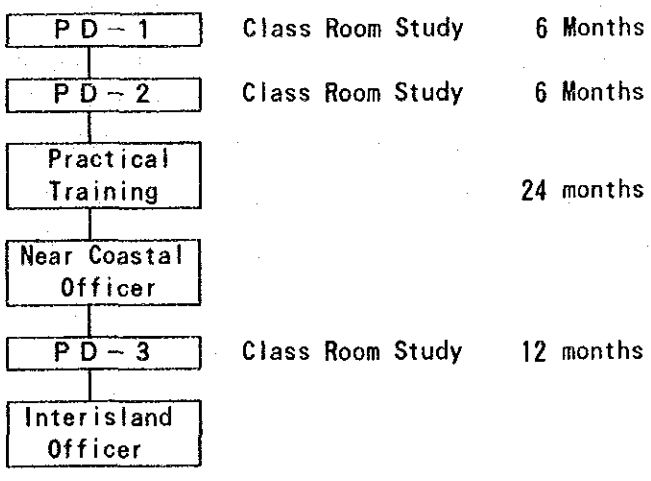
second semester are given below. The student enrollment for this year including those expected to enroll in the second semester is more than 694. The total number including those to be enrolled for re-education will be about 900, far exceeding the number of the previous year.

Table 2-3-2 Curriculum and Student Body for 1994

Curriculum		1st Semester Class	1st Semester Students	2nd Semester Class	2nd Semester Students
PD-1	Regular students	4	138	4	120
	Shipping PT PELNI	2	59		undecided
	Company TOEI PEEFER	1	15		
PD-2			-	4	120
PD-3		2	32		-
Special courses (Re-education of seamen)					
Near coast voyage program			29		undecided
SHIPDECO (NORWAY)			31		undecided
ANDHIKA TRANSPORT LTD			-		50
SAMUDERA PETRINDO ASIA			-		100
PERTAMINA			-		undecided
Total number of students			304		390

NB) Classes will not be held if the number of students is less than 15.

At the Barombong Rating School, regular students complete PD-1 in 6 months and then take PD-2 for another 6 months. After 2 years of practical training on board, they qualify for certification as near coastal officers. They must complete 12 months' study in PD-3 in order to qualify as interisland officers.



The Barombong Rating School is the only school in Indonesia with educational and training facilities which meet the requirements of the STCW Convention. The School accepts students from a marine academy and a seamen's school in Sulawesi to give safety education and training in accordance with the request of the Education and Training Agency. The principal of the School is well informed of the requirements for foreign shipping crews and officers with his ample experience on foreign ships and his education in navigation in the Netherlands, and administers education according to the STCW Convention requirements.

(2) Curriculum

The STCW Convention (International Convention for Standards on Training, Certification and Watchkeeping for Seafarer's) was established in 1978, became effective in 1984, and was ratified by Indonesia in 1986. The Indonesian syllabus under which education and training are given at the School is based on the detailed teaching syllabus of IMO (International Maritime Organization) which meets the requirements of the Convention.

The portions of STCW requirements that are relevant to the present Project are discussed below. The excerpt copy of these portions is attached to this report as the appendix 5.

(3) Changes in Enrollment

Fig. 2-3-2 shows changes in the number of students since the School was opened in 1980. Until 1983, the School offered re-education for seamen in active duties and the number of students increased steadily. From around 1984 when training of students for interisland ratings was started, the number of students dropped temporarily due to lack of the School's public relations activities regarding changes in the system. As the courses for qualifying students for certifications as the international ratings and interisland officers were offered and the job recruitment became favorable, the number of students turned upward again. In 1993, there were 679 students, a radical increase of 75% over the previous year. In 1994, more than 900 students are expected to attend.

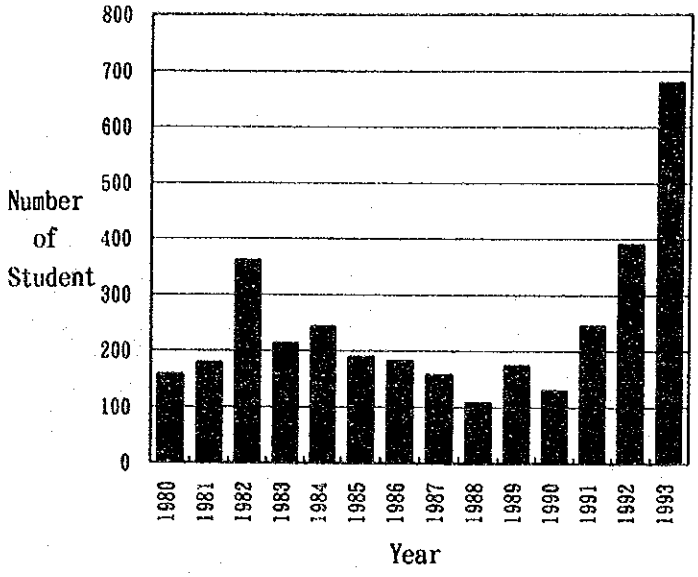


Fig. 2-3-2 Changes in Enrollment

(4) Financial Status of the School

The annual budget for the School is roughly classified into the routine budget and the project budget. The former is for management expenses such as personnel expenses, electricity bills, and maintenance fees for the facilities and equipments. The latter is for projects such as improving the buildings, facilities and equipments for training.

Fig. 2-3-3 shows transition in these budget items. Up to 1990, the routine budget was in the order of 200 million Rp, but with the increased number of students, the budget was also increased, i.e. from 427 million Rp in 1991 to 714 million Rp in 1993, and to 928 million Rp in 1994.

About 200 million Rp was allocated to projects up to 1985 when there were larger number of students, but no fund was available for the years from 1986 to 1991 because of the decreased number of enrollment. After 1992 when the enrollment picked up, the budget was restored and 495 million Rp was allotted for expansion of the dormitory and construction of a multi-purpose hall. In 1994, 722 million Rp is proposed for a new staff building and a student dormitory and purchase of training machinery and equipments.

The budgets for both routine expenses and project expenses are on the increase in recent years. With the budget for improving facilities and equipments, the School can barely manage to address the radical increase of students and can hardly hope to construct large scale buildings and to purchase expensive equipments.

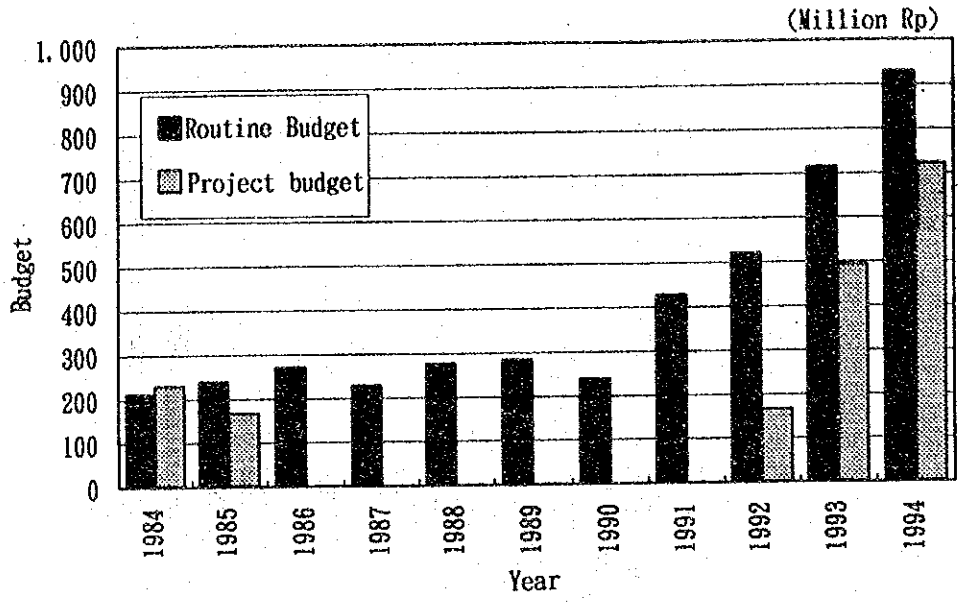


Fig. 2-3-3 Transition of School Budget

(5) Problems Faced by the School

The basic facilities of the School were improved by the two grant aids from Japan in 1980 and 1987. Further improvements are being made by the self-support efforts of Indonesia. There are inevitably obsoleting of some training facilities and equipments. There are some delay and difficulty to purchase new expensive equipments and to install new large scale facilities.

The following list enumerates the items which are required by the STCW Convention but not practicable due to lack of facilities or during rough sea condition.

1) Annex to the Resolution 19 of the STW Conference;
Recommendation on Training of Seafarers in Personal Survival Techniques.

* Entering the water from a height wearing a life jacket
* Swimming while wearing a life jacket
(impossible during rough wave condition)
* Keeping afloat without a life jacket
(impossible during rough wave condition)
* Boarding life raft from ship and or water while wearing a life jacket
* Assisting others to board a survival craft
* Operation of survival craft equipment including basic operation of portable radio equipment
* Streaming a drogue or sea anchor

2) Regulation VI/1;

Mandatory Minimum Requirements for the Issue of Certificates of Proficiency in Survival Craft.

Demonstrate to the satisfaction of the Administration by examination or by continuous assessment during an approved training course that he possesses the ability to;

* Don a life jacket correctly; safely jump from a height into the water; board a survival craft from the water while wearing a life jacket
* Right an inverted life raft while wearing a life jacket
* Make the correct commands required for launching boarding the survival craft; clearing the ship and handling and disembarking from the survival craft
* Prepare and launch survival craft safely into the water and clear the ship's side quickly.

3) Appendix to Regulation VI/1

Minimum Knowledge Required for the Issue of Certificates of Proficiency in Survival Craft.

* Launching a survival craft

2-3-3 Outline of Facilities and Equipment

The basic facilities and equipments of the School were consolidated and improved by Japan's grant aid and expanded by the self-support efforts of Indonesia. The school buildings, training facilities and equipments are outlined below. Fig. 2-3-4 shows the existing location of facilities.

Table 2-3-3 Outline of Buildings

Name of building	No.	Floor area	Remarks
Main building	2	2,054 m2	Built in 1980 granted by Japan
Practical building	1	790	〃 〃
Canteen	1	790	〃 〃
Dormitories	2	2,054	〃 〃
Boat house	1	182	〃 〃
Mechanical equipment building	1	295	〃 〃
Library	1	210	Built by Indonesia
Infirmary	1	150	〃 〃
Fire-fighting facility	2	360	〃 〃
Garage	1	160	〃 〃
Practical training building	1	355	Built in 1987 granted by Japan
Multipurpose hall	1	600	Built by Indonesia

Table 2-3-4 Outline of Training Facilities

Name of facilities	Description	Remarks
Groyne	50 m x 60 m	Built in 1980 granted by Japan
Cargo crane	Motor operated	〃 〃
Boat davit	Manually operated	〃 〃
Jetty	30 m x 3.5 m	Built in 1987 granted by Japan

Table 2-3-5 Outline of Training Equipments

Name of equipments	Description	Remarks
Navigation training equipments	Device for training of steering Gyro compass	Equipped in 1980 granted by Japan
	Training device for radar	〃 〃
	Engine/telegraph	〃 〃
Life-saving equipments	Inflatable life raft	〃 〃
	Life-saving signal device	〃 〃
	Cutter boat	〃 〃
	Diving apparatus	〃 〃
Fire-fighting equipments	Fire extinguishing pump	〃 〃
	Respirator and Others	〃 〃
Deck equipments	Cutter lift	〃 〃
	Deck equipments	〃 〃
Engine equipments	Casting equipments	〃 〃
	Machinery and tools	〃 〃
	Automatic control devices	〃 〃
	Others	〃 〃
Vehicles	Bus	〃 〃

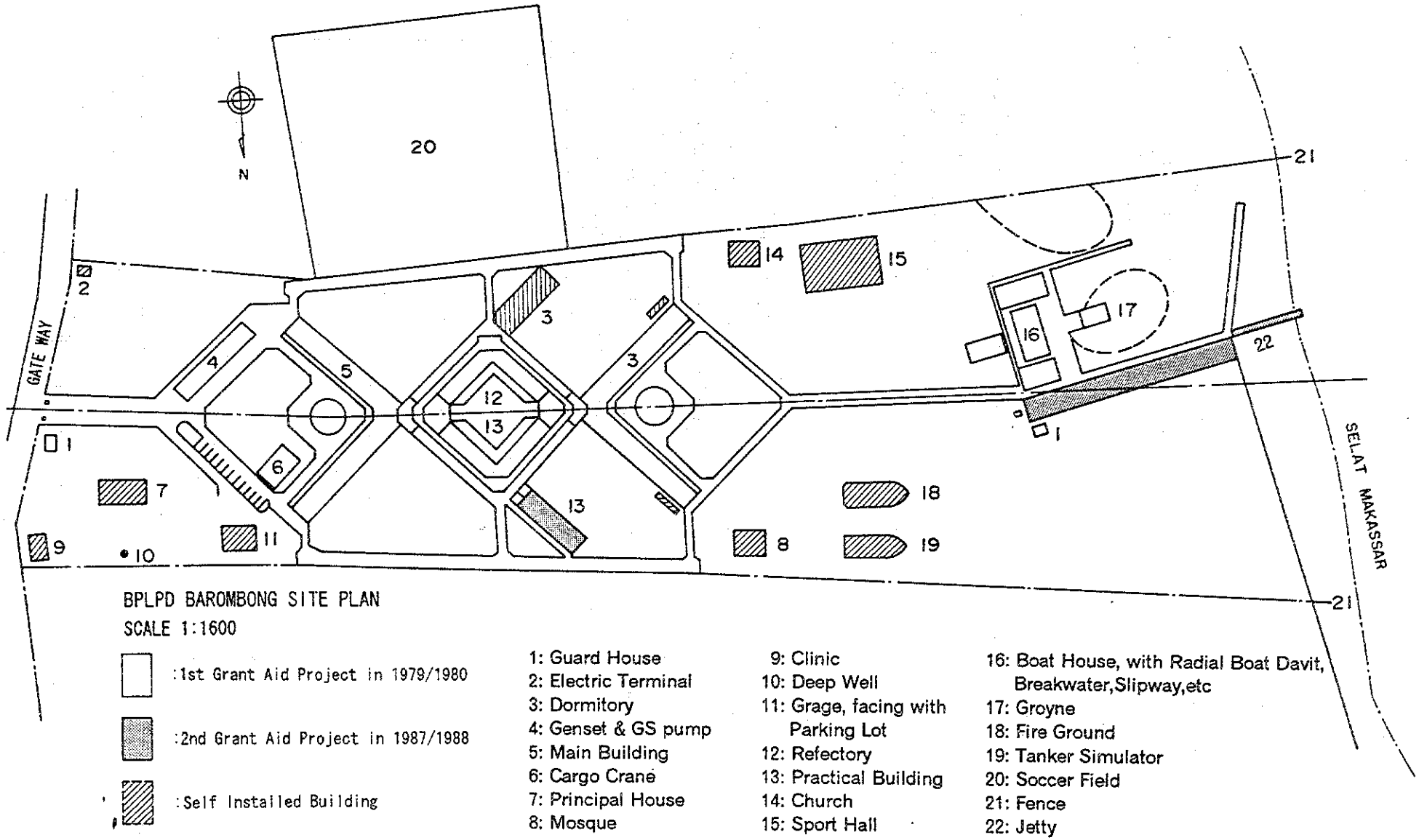


Fig. 2-3-4 Location of Existing Facility

2-3-4 Location and Condition of Project Site

Ujung Pandang is the capital city of South Sulawesi Province and faces the Makassar Strait at the south end of Sulawesi Island. The Barombong Rating School is sited on the beach at about 9 km south of Ujung Pandang and is surrounded by agricultural and coastal fishing villages.

(1) Climatic Conditions

South Sulawesi Province lies in the tropical zone and has the rainy season from November to March and the dry season from April to October. Barombong has no weather station and relies on the weather data observed at Kepala Stadium Meteorologi located in the nearby Hasanuddin Air Port and Ujung Pandang Port.

1) Temperature

Fig. 2-3-5 shows the monthly changes in the mean temperatures (maximum and minimum) in the last 10 years. The mean temperature in Ujung Pandang fluctuates little throughout the year and remains between 26 and 28 degrees. The mean maximum and minimum temperatures are 33.5 and 21.1 degrees during the dry season and 29.8 and 23.1 degrees during the rainy season. The diurnal range becomes larger in the dry season.

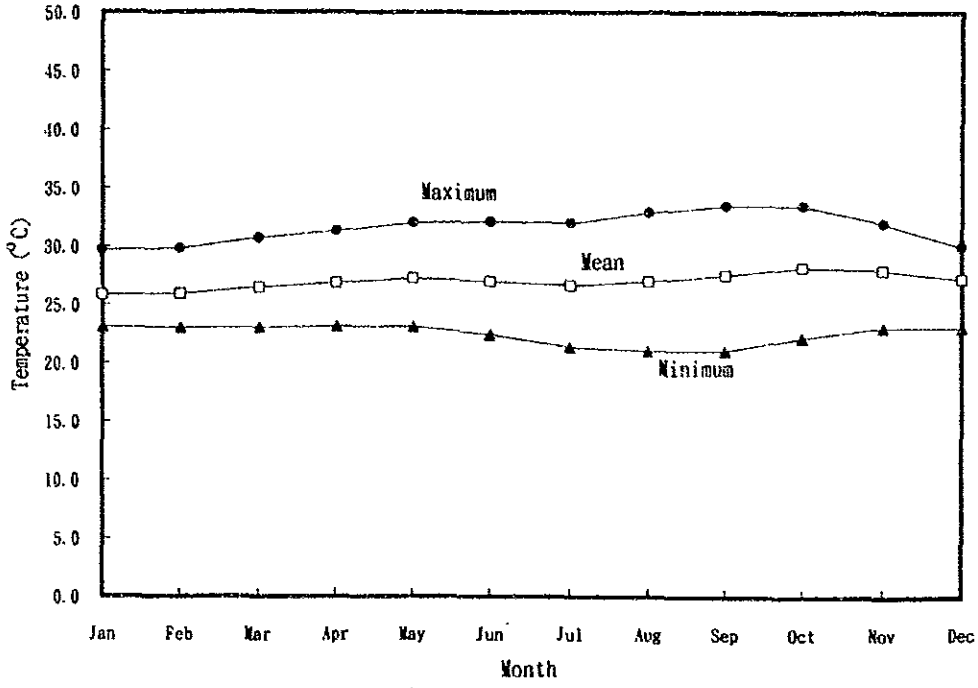


Fig. 2-3-5 Changes in Mean Temperature (1984 - 1993)

2) Humidity and Rainfall

Fig. 2-3-6 shows the changes in monthly mean humidity and rainfalls. The mean humidity is lowest at 70% in August and September during the dry season and rises to 85 - 90% during the rainy season. The rainfall concentrates in the rainy season and the monthly rainfall in December, January and February exceeds 500 mm. It hardly rains during the dry season, and the minimum rainfall is about 10 mm in August. The annual rainfall is about 3,000 mm.

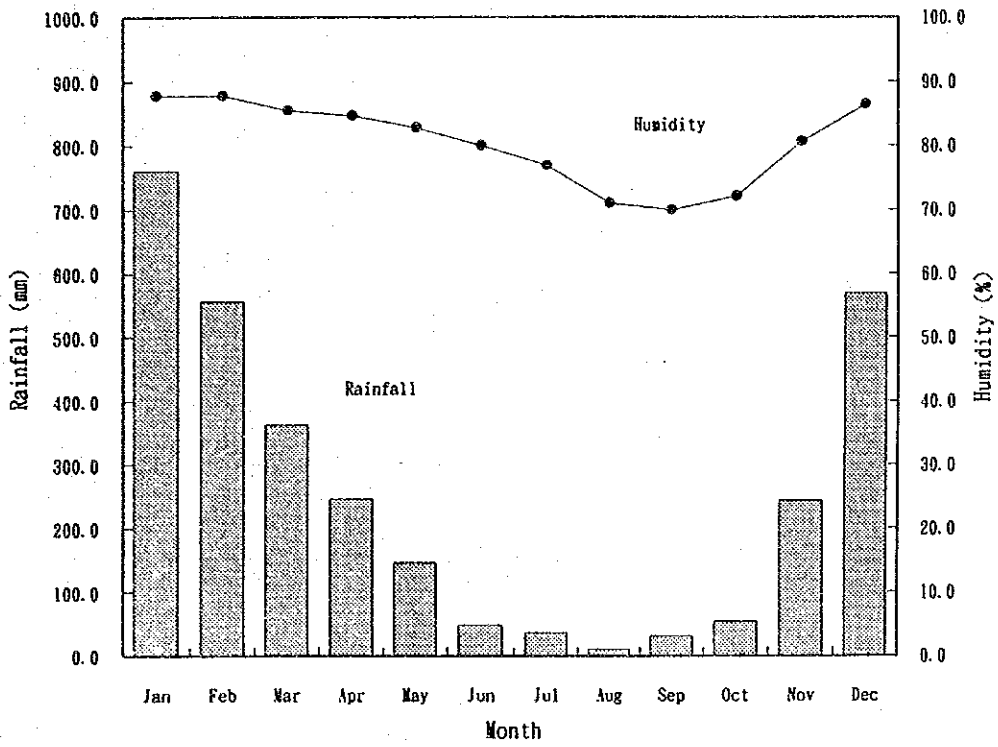


Fig. 2-3-6 Changes in Mean Humidity and Rainfall (1984-1993)

4) Wind Directions and Velocity

The wind observation record for 10 years from 1984 to 1993 at Hasanuddin Air Port reveals no record of cyclones in the area and the wind characteristics remain substantially constant throughout the year.

Table 2-3-6 and Fig. 2-3-7 show the directional frequencies of daily average wind velocity and the wind rose. There are shown high frequencies of the easterly and the westerly winds which are perpendicular to the coastal

line of Barombong Area, with the westerly wind prevailing during the rainy season and the easterly wind prevailing during the dry season. The velocity hardly exceeds 6 knots (about 3 m/s).

Table 2-3-7 and Fig. 2-3-8 show the daily maximum wind velocity. As there is no record of the wind of which maximum velocity exceeds 40 knots (20 m/s), no severe storm by cyclone is expected.

Table 2-3-6 Frequency Distribution of Daily Average Wind Velocity (1984 - 1993)

Wind Velocity (Knots)		N	NE	E	SE	S	SW	W	NW	Total
0 - 2	Dry Season	4.17	0.79	5.76	3.97	0.67	0.79	6.95	3.64	26.74
	Rainy Season	2.24	0.94	5.61	3.64	1.87	1.41	12.86	4.96	33.53
	Round Year	3.04	0.88	5.67	3.78	1.37	1.15	10.41	4.41	30.71
2 - 4	Dry Season	8.00	1.92	19.25	13.31	2.25	0.93	12.51	11.98	70.15
	Rainy Season	3.36	3.37	9.95	10.76	2.94	2.06	23.06	6.92	62.42
	Round Year	5.29	2.76	13.80	11.80	2.66	1.59	18.71	9.02	65.63
4 - 6	Dry Season	0.40	0.00	0.53	0.13	0.00	0.13	0.99	0.53	2.71
	Rainy Season	0.42	0.51	1.40	0.38	0.09	0.09	0.79	0.23	3.91
	Round Year	0.41	0.30	1.04	0.28	0.05	0.11	0.87	0.36	3.42
6 - 8	Dry Season	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.07
	Rainy Season	0.00	0.05	0.09	0.00	0.00	0.00	0.00	0.00	0.14
	Round Year	0.00	0.03	0.05	0.00	0.00	0.00	0.00	0.03	0.11
8 -	Dry Season	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.33
	Rainy Season	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Round Year	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.13
Total	Dry Season	12.70	2.71	25.54	17.41	2.92	1.85	20.45	16.42	100.00
	Rainy Season	6.02	4.87	17.05	14.78	4.90	3.56	36.71	12.11	100.00
	Round Year	8.79	3.97	20.56	15.86	4.08	2.85	29.99	13.90	100.00

Rainy Season: November to march
Dry Season: April to October

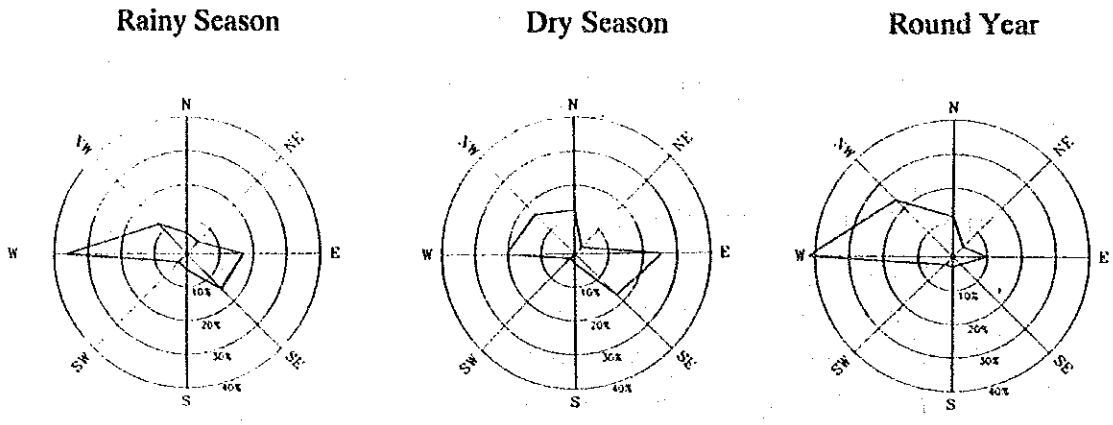


Fig. 2-3-7 Wind Rose of Daily Average Wind Velocity (1984 - 1993)

Table 2-3-7 Frequency Distribution of Daily Maximum Wind Velocity
(1984 - 1993)

Wind Velocity (Knots)		N	NE	E	SE	S	SW	W	NW	Total
0 - 5	Dry Season	1.52	0.46	1.32	0.53	0.07	0.53	1.79	1.99	8.21
	Rainy Season	1.45	0.56	0.56	0.42	0.23	0.56	3.55	2.24	9.57
	Round Year	1.48	0.52	0.88	0.47	0.16	0.55	2.82	2.14	9.02
5 - 10	Dry Season	11.79	0.93	3.97	1.92	1.85	2.05	21.80	19.93	64.24
	Rainy Season	4.25	2.76	6.68	1.45	1.64	1.40	34.74	13.83	66.75
	Round Year	7.37	2.00	5.56	1.64	1.73	1.67	29.37	16.36	65.70
10 - 15	Dry Season	3.64	0.33	1.32	0.79	0.79	0.79	4.77	4.11	16.54
	Rainy Season	1.26	1.40	2.94	0.61	0.51	0.33	8.83	2.62	18.50
	Round Year	2.25	0.96	2.27	0.68	0.63	0.52	7.15	3.23	17.69
15 - 20	Dry Season	0.40	0.07	0.66	0.33	0.53	0.46	2.32	1.85	6.62
	Rainy Season	0.23	0.79	0.89	0.14	0.19	0.09	1.31	0.28	3.92
	Round Year	0.30	0.49	0.79	0.22	0.33	0.25	1.73	0.93	5.04
20 - 25	Dry Season	0.26	0.07	0.20	0.00	0.13	0.26	1.26	0.53	2.71
	Rainy Season	0.09	0.14	0.28	0.00	0.09	0.00	0.14	0.23	0.97
	Round Year	0.16	0.11	0.25	0.00	0.11	0.11	0.60	0.36	1.70
25 - 30	Dry Season	0.00	0.00	0.07	0.00	0.07	0.00	0.60	0.40	1.14
	Rainy Season	0.05	0.05	0.05	0.09	0.00	0.00	0.00	0.00	0.24
	Round Year	0.03	0.03	0.05	0.05	0.03	0.00	0.25	0.16	0.60
30 - 35	Dry Season	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.07	0.20
	Rainy Season	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.05
	Round Year	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.03	0.11
35 - 40	Dry Season	0.07	0.00	0.00	0.00	0.00	0.00	0.07	0.20	0.34
	Rainy Season	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Round Year	0.03	0.00	0.00	0.00	0.00	0.00	0.03	0.08	0.14
Total	Dry Season	17.68	1.86	7.54	3.57	3.44	4.09	32.74	29.08	100.00
	Rainy Season	7.33	5.70	11.40	2.71	2.66	2.38	48.62	19.20	100.00
	Round Year	11.62	4.11	9.80	3.06	2.99	3.10	42.03	23.29	100.00

Rainy Season: November to march
Dry Season: April to October

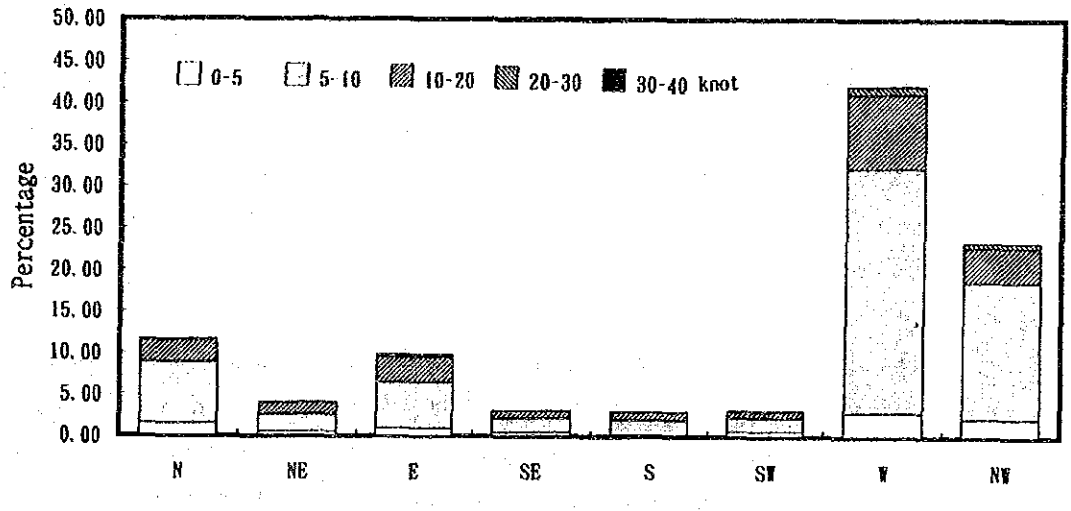


Fig. 2-3-8 Frequency Distribution of Daily Maximum Wind Velocity
(1984 - 1993)

(2) Sea Conditions

1) Tide level

The relationship of tidal levels in the sea around Ujung Pandang Port is shown in Fig. 2-3-9.

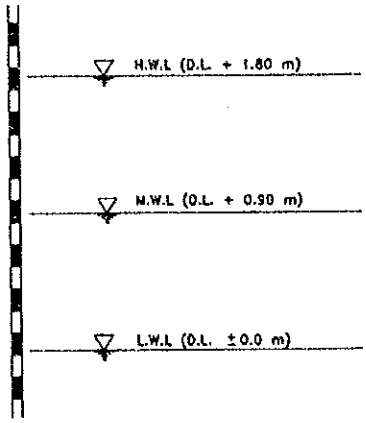


Fig. 2-3-9 Tide Condition at Ujung Pandang Port

2) Waves

There is no wave observation station near Ujung Pandang and the wave observation data are extremely scarce.

The data currently available was obtained off the Island of Lae-lae in the offshore of Ujung Pandang Port during the dry season of April to October in 1988 when the survey on the urgent repair work of the port was executed. It was learned that the incidence of significant wave height of below 0.3 m was 94%, that of the significant wave height of above 0.5 m 2.2%, and the maximum wave height during the observation period was 0.92 m. The predominant wave period was 3 to 4 seconds.

The design waves were estimated by SMB method based on the wind data of the past decade at Hasanuddin Air Port. The design wind velocity was set at 21 m/s by statistically processing the 50 year statistical wind velocity, and the wind generation and attenuation process model was established using the duration as 12 hours based on the observation results at site. The design offshore wave height and the period were as follows.

Design offshore wave height; Ho = 2.2 m
Period; T = 5.5 s
(50 year return period)

The design wave height at the construction site was calculated by wave deformation formula based on wave refraction and wave breaking of design waves. Table 2-3-8 shows the design significant wave height, the maximum wave height and the rises of mean sea level due to wave breaking for different depths along the construction site of the cutter training facility will be located. The appendix-6 shows the details of the wave estimation result.

Table 2-3-8 Design Wave Height at Different Depths

Depth D.L.	Tide Level	Sig. Wave Height (H1/3)	Max. Wave Height (Hmax)	Wave Set-up
-1.0 m	H.W.L.	1.7 m	2.2 m	0.04 m
-1.5 m	(D.L. .	1.8 m	2.5 m	0.03 m
-2.0 m	+1.8 m)	1.8 m	2.7 m	0.02 m
-2.5 m		1.9 m	2.9 m	0.01 m
-3.0 m		1.9 m	3.1 m	0.01 m

3) Coastal Current Condition

The current velocity and direction of the surface layer were measured using a float at the time of spring tide in the waters in front of the School. The current velocity was as subtle as 0.15 knot and the direction was northeasterly and closer to the shore.

(3) Topography

The topographical survey of the School ground and the sounding survey at 500 m offshore and 400 m along the coast were conducted in order to determine the land and the sea bottom topography. Fig. 2-3-10 shows the results.

The ground is about D.L. +2.0 m and well prepared. The sea bottom has a gently sloping profile. Fig. 2-3-11 shows the profile of the sea bottom where the bottom slope is very gentle at 1/50 - 1/60 with a sand bar at D.L. -0.5 m.

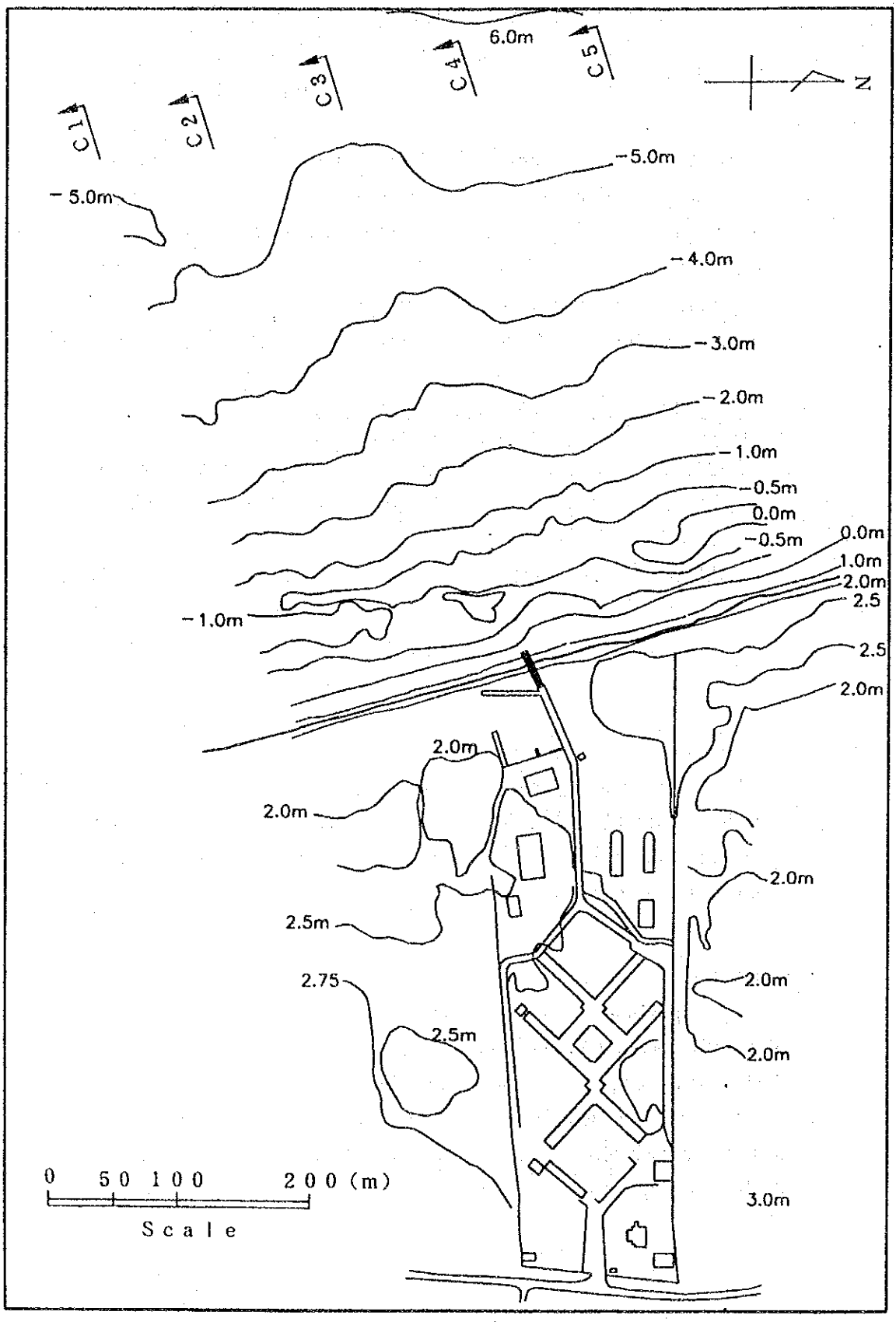


Fig. 2-3-10 Topography and Result of Sounding Survey in the Vicinity of the Barombong Rating School

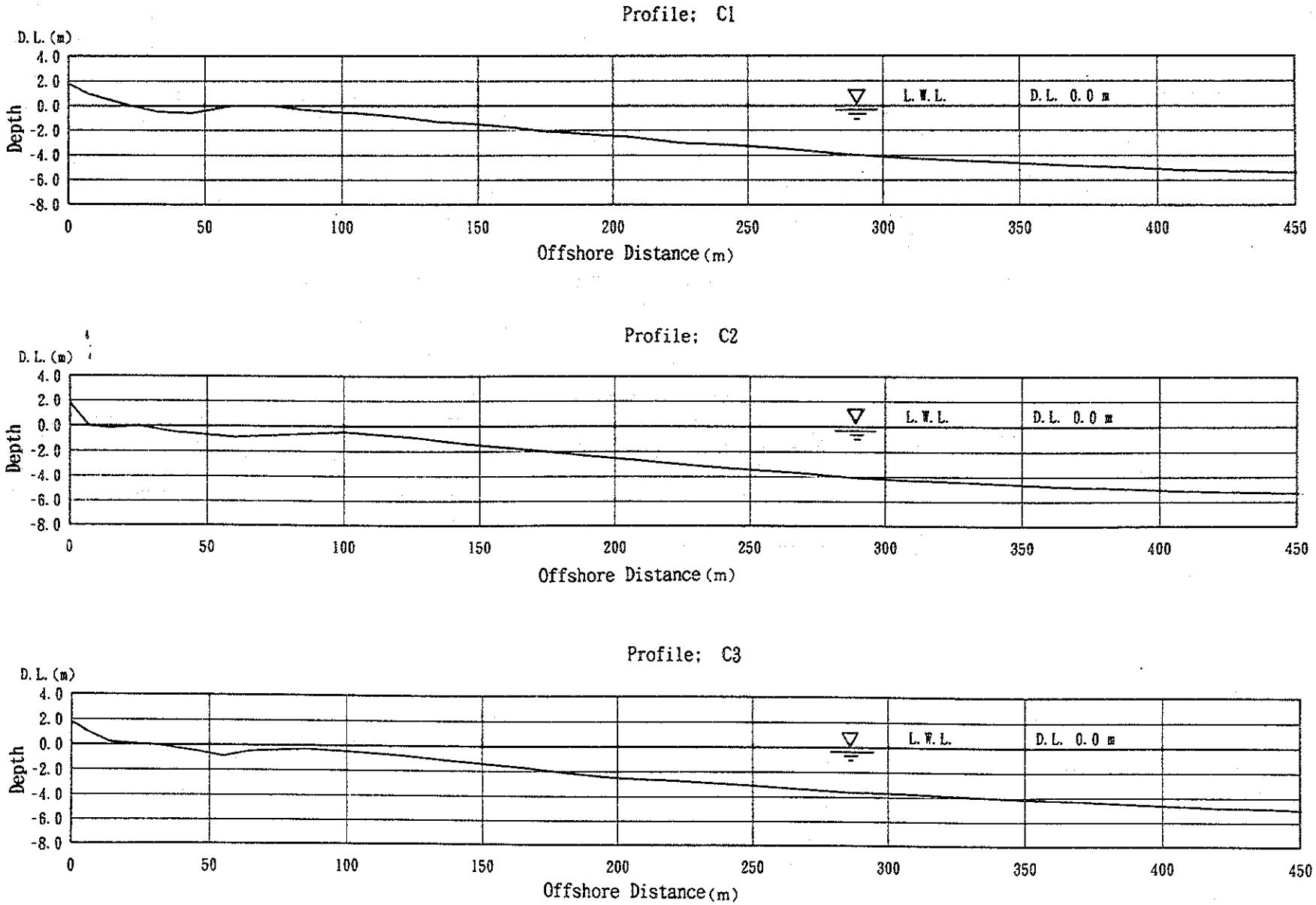


Fig. 2-3-11(1) Profiles of Beach in Front of the Barombong Rating School

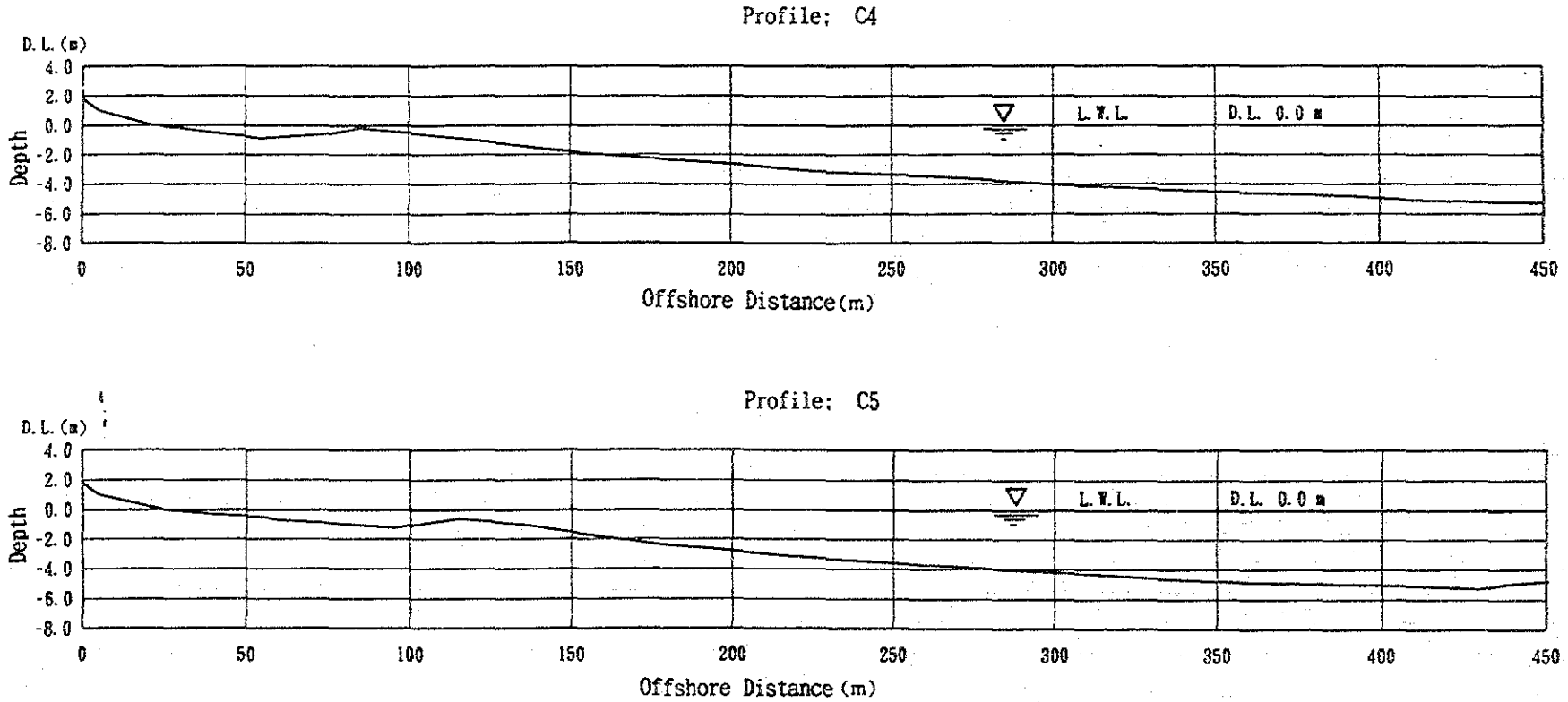


Fig. 2-3-11(2) Profiles of Beach in Front of the Barombong Rating School

(4) Soil Conditions

A boring survey was conducted at the proposed sites for the cutter training and the survival training facilities. Fig. 2–3–12 shows the profile of borehole at respective survey points. The soil characteristics based on these boring logs are discussed below.

1) Soil characteristics of the proposed area for the cutter training facility

The boring survey was conducted at three points of 100 meter intervals in the offshore direction from the tip of the existing jetty.

The stratum consisted from the top to the bottom of a sandy silt layer, a silty clay layer and a supporting silt stone layer.

The standard penetration test revealed a thin layer of comparatively good soil with N = 11 in the surface layer at BH–1 which is closest to the shore. The sublayer was about 2 m thick with N = 5, and the bottom layer was poor subsoil of N = 0 as far as the supporting layer was concerned. At BH–2 and BH–3 on the offshore side, both the surface and the middle layers were poor with N = 0. The silt stone layer which is the bedrock had N value exceeding 50 which was uniformly distributed at all the points. The silt stone core samples were unconsolidated rocks with the compressive strength of qu = 31 ~ 33 kg/cm2, allowing driving of the steel piles.

The sand on the beach had the median grain diameter (d50) of about 0.25 mm according to the grain size distribution analysis of sands collected at the existing jetty as shown in Fig. 2–3–13.

2) Soil Characteristics of the proposed area for survival training facility

The pool for the survival training facility has a depth greater than usual for jumping, and therefore its soil conditions are given a special consideration in designing the foundation for the structure. Additional boring survey was therefore conducted.

As shown in the bore hole log in Fig. 2–3–12, the soil composition is the same as that in the sea, i.e. sandy silt layer for the surface, silty clay layer for the middle layer and the silt stone layer for the support at the bottom.

The standard penetration test result revealed somewhat better N values than the sea; N = 8 for the surface, N = 3 for the middle and N $\geqq$ 50 for the silt stone layer.

The ground water level was at 1.5 m depth from the current ground height and needs measures for spring water at the time of the pool construction.

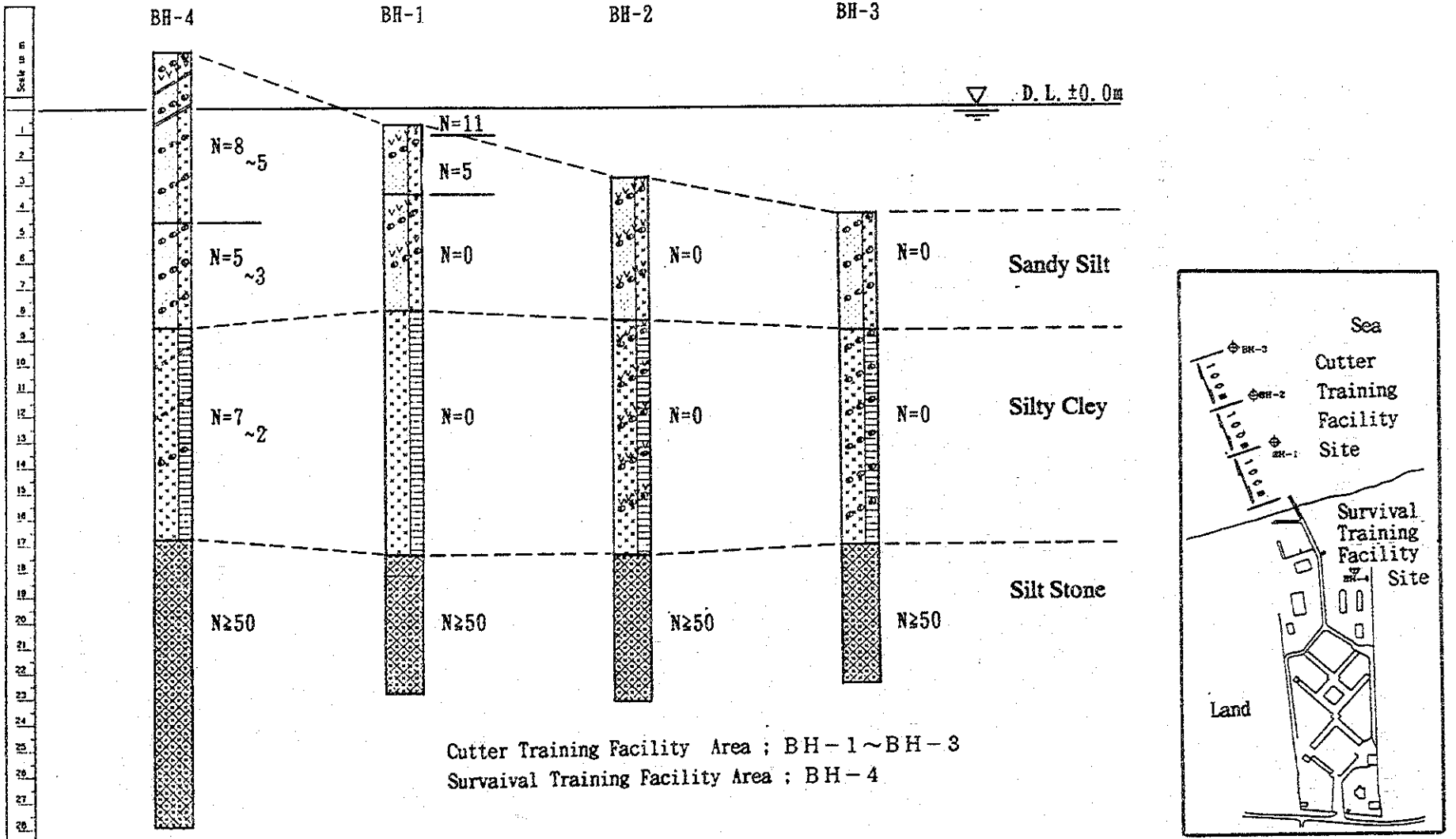


Fig. 2-3-12 Profile of Boreholes

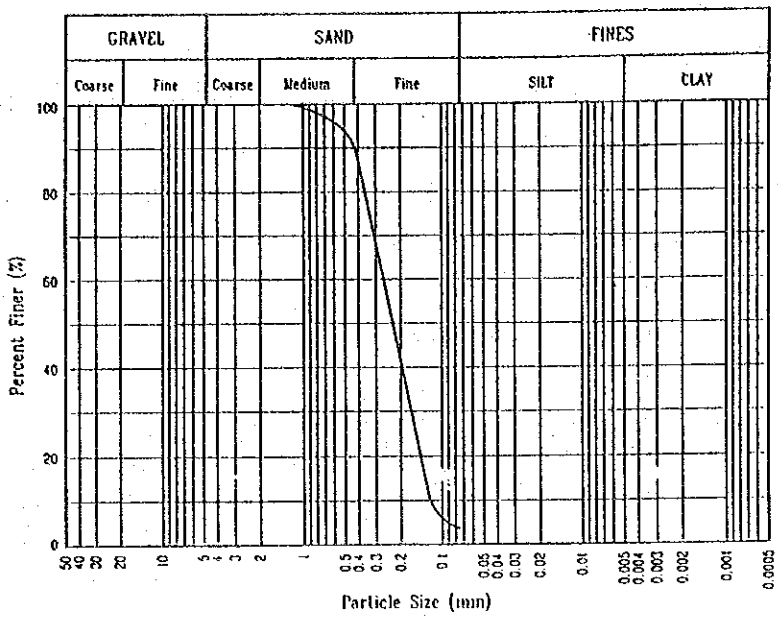


Fig. 2-3-13 Grain Size Distribution of Sand at the Jetty

(5) Earthquakes

In South Sulawesi Province where Ujung Pandang is located, the seismic activities are of the medium degree compared to other areas of Indonesia and therefore the effect of earthquakes should be taken into consideration. The design seismic coefficient is set based on the coefficients employed for architectural designs as defined by Indonesia's Rules for Construction and Engineering as shown in Fig. 2–3–14.

Design seismic coefficient (Cd); Cd = C•I•K

Areal seismic coefficient	C = 0.05 (Zone 4, poor soil)
Importance coefficient	I = 1.0 (civil engineering structure)
	1.5 (architectural structure)
Structure coefficient	K = 1.0 (reinforced concrete structure, steel structure)

The design seismic coefficients used in designing the proposed facilities are as follows.

Civil engineering structure	Cd = 0.05
Architectural structure	Cd = 0.075

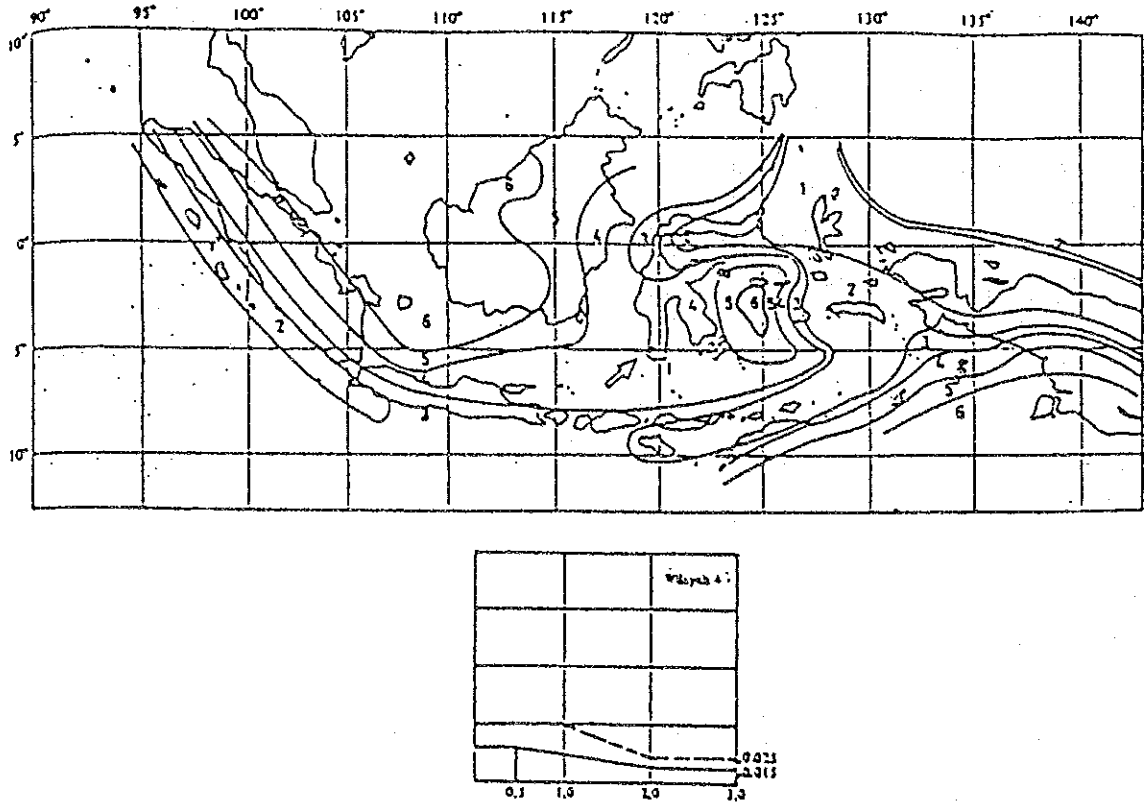


Fig. 2–3–14 Calculation of Design Seismic Coefficient

(6) Littoral Drift

The proposed area for the cutter training facility is located on a very gentle sandy beach and is likely to be subjected to littoral drifts as is evidenced by the siltation of the existing groyne and advance of the shoreline in the vicinity. The estuary of the Jeneberan River is located at 1 km north of the School and the river supplies most of the littoral sands. The river improvement works and construction of the training jetty at the estuary and the dam construction upstream will likely affect the coastal area in question as the sands accumulates and the shoreline tends to advance forward.

To accurately assess the changes in the shore topography caused by littoral sands is most important in planning the cutter training facility.

1) Beach Profile Changes in the Extensive Area

In absence of the systematic survey results of the beach profile, we studied the extensive coastal line from the bathymetric map and investigated the coastal changes by interviewing local people. Fig. 2-3-15 shows the distance of 20 km from the estuary of the Jeneberan River to the Sangrabengi Point.

The year when the survey of the shoreline in the figure was conducted is not exactly known, but it is estimated from the topography of the estuary of the Jeneberan River to have been around 1979 before the groyne was built for the School.

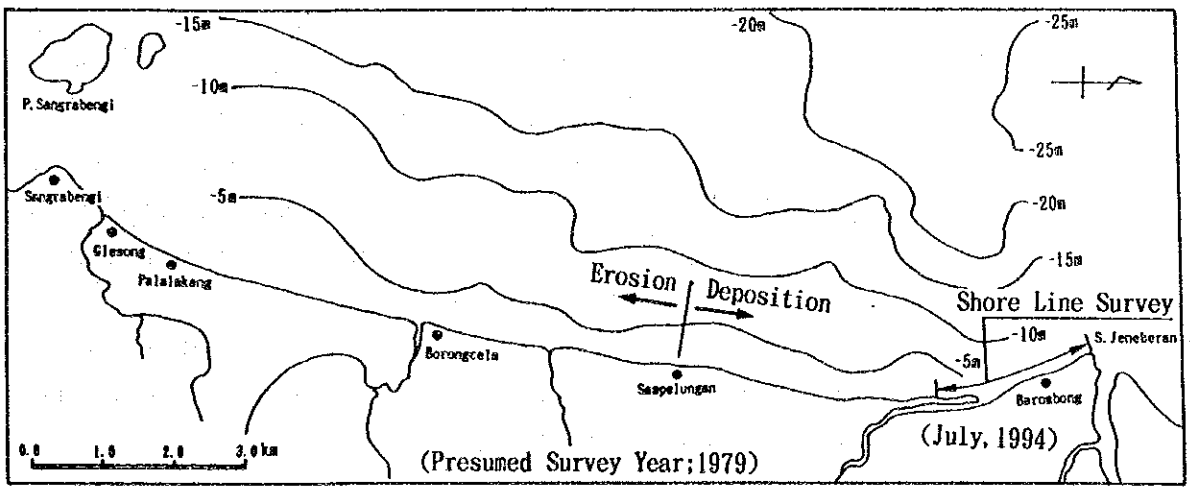


Fig. 2-3-15 Extensive Bathymetry
(From the Jeneberan River to the Sangrabengi Point)

The result of the interview survey regarding changes in the shoreline is discussed below.

a. The beach at the base of the jetty (extension; 200 m) on the left bank of the Jeneberan advanced by 50 to 60 m within a year following the completion of the jetty.

b. The beach in front of the School advanced by 80 m in 15 years between 1980 and 1994.

c. The beach near Sampelungan advanced by 30 – 50 m during the past 15 years.

d. The beach near Borongcela receded by 30 – 40 m during the past 15 years.

e. The beach around Sangrabengi receded by almost 500 m during the past 10 years.

f. The rivers in the south of Borongcela went dry recently and the nearby coast line recedes during the dry season.

From the above results, it is assumed that sedimentation occurs in the north of Sampelungan, which is the approximate center between the Jeneberan River and the Sangrabengi Point, and erosion occurs in the south.

Using the fore mentioned bathymetric map, the aerial photos taken in October, 1993 and the result of the survey in this study, the changes in the nearby coastal lines extending for about 4 km were examined.

The shorelines were compared based on these topographical data shown in Fig. 2-3-16. The estuary of the Jeneberan River is locally eroded at the base of the training jetty, but sedimentation seems to dominate the overall beach area and the shorelines are advancing. The advance is about 60 m near the groyne and exceeds 150 m in farther south.

The shoreline changes near the groyne suggest no localized deformation attributable to constructing of the groyne, but the changes in the topography are larger in scale and more extensive.

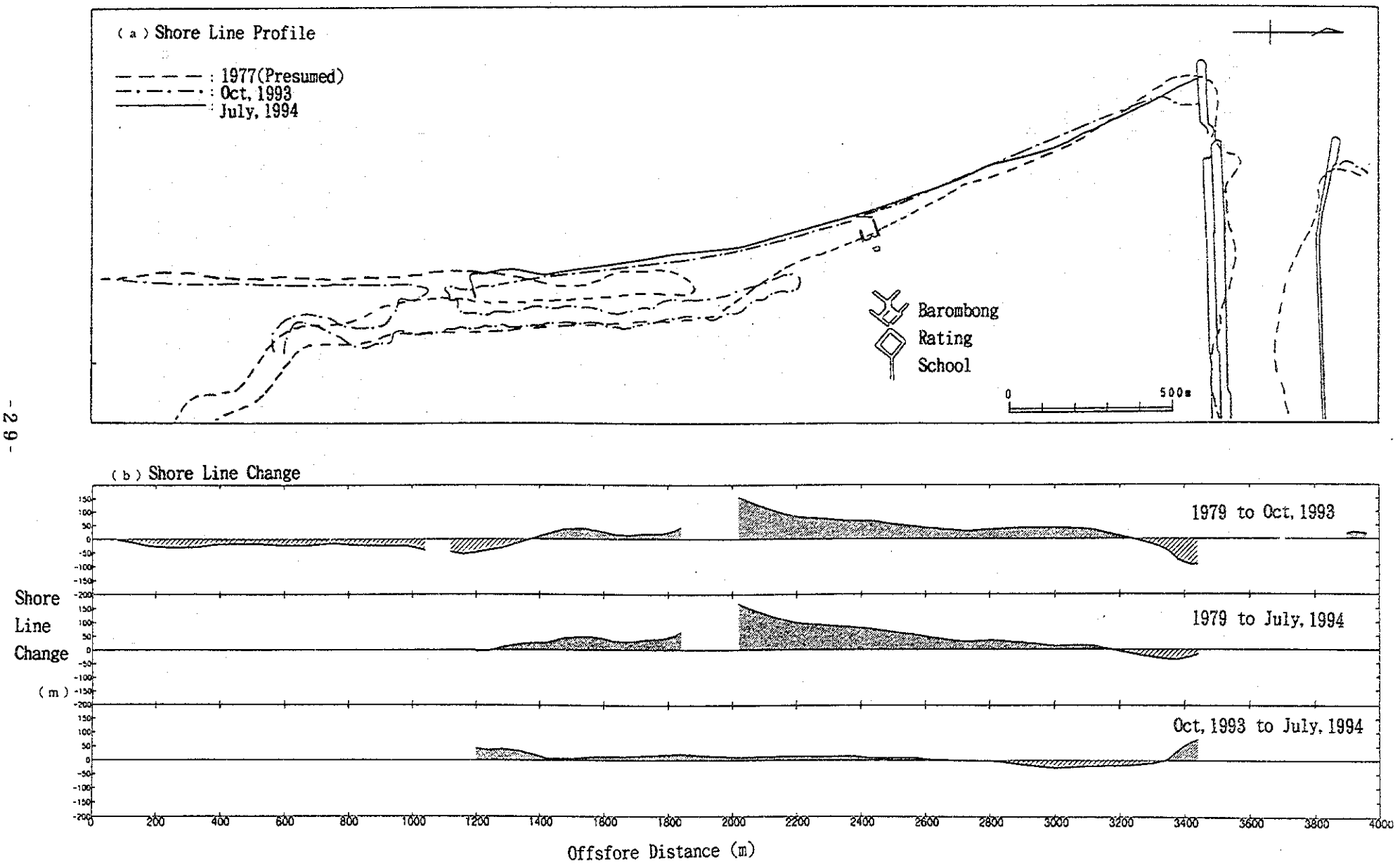


Fig. 2-3-16 Changes in Shoreline Near the School

2) Changes in the beach profile in front of the School

The shorelines presumed from the photos of the groyne and the jetty taken by a JICA expert are shown in Fig. 2-3-17. The result shows that the shoreline advanced by about 20 m between 1979 and 1980 due to the construction of the breakwater for the groyne, and further by about 70 m during the four years between 1980 when the breakwater was completed and 1984, extending as far as to the sea off the center of the breakwater. Even though the advance rate has subsequently slowed down, it still continues and the shoreline reached the top of the breakwater in about 1992.

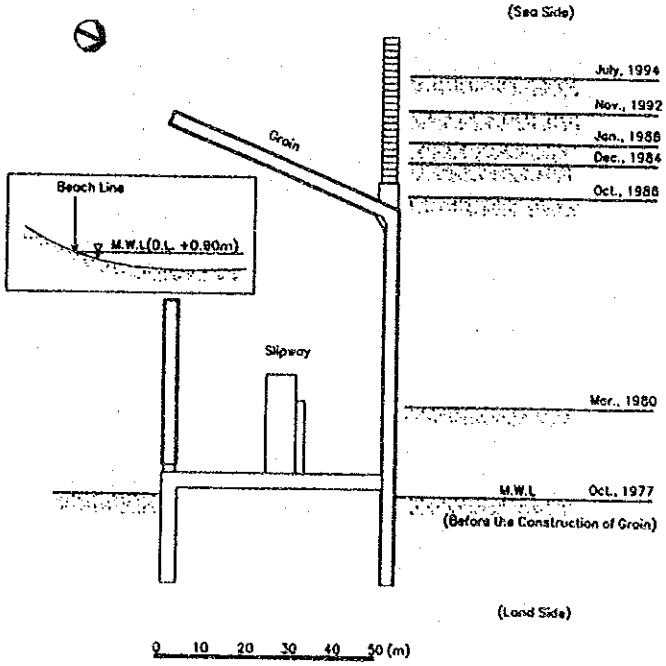


Fig. 2-3-17 Presumed Locations of Shoreline by Photo Records

The profile change of sea bottom was studied based on the results of the bathymetric surveys of the shore in front of the School conducted in October, 1984 and May, 1985 and the survey conducted by this study in July, 1994.

Fig. 2-3-18 shows the cross sections of the sea bottom extending from the jetty based on the result of the bathymetric surveys. As shown, the depth of the sea bottom decreased by about 1 m during the 10 year period from 1984 to 1994, suggesting a large amount of sand accumlation over an extensive area of the beach.

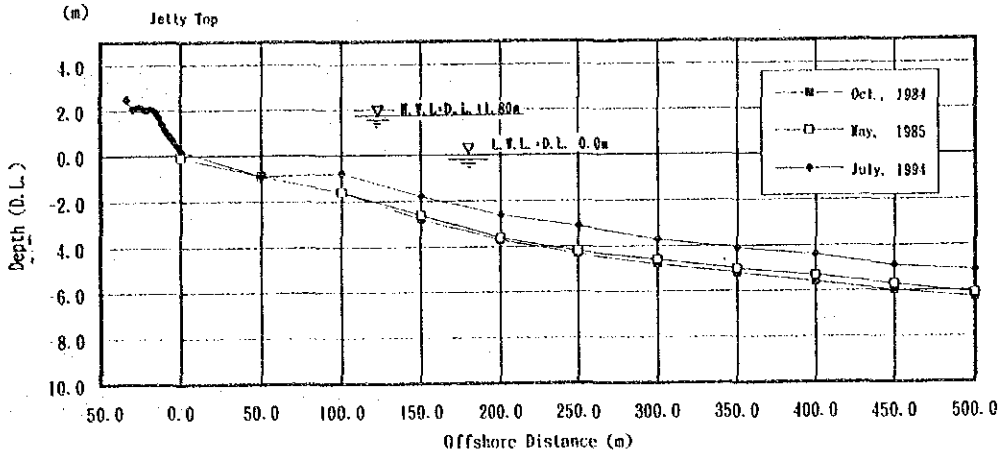


Fig. 2-3-18 Changes in the Sea Bottom in Front of the School

Surveys of the sea bottom cross sections along the jetty and its offshore survey line have been conducted once a month since August, 1993 by a JICA expert.

Fig. 2-3-19 is an example of the survey results showing the beach cross sections near the shoreline where the waves uprush. This indicates seasonal changes of the shore topography, decreased water depth by sedimentation during the rainy season, and farthest advancing of the shoreline in April when the rainy season ends. During the dry season, the coast is eroded and recedes, and the water depth tends to increase. The difference in the water depth between the rainy season and the dry season is about 60 cm at most.

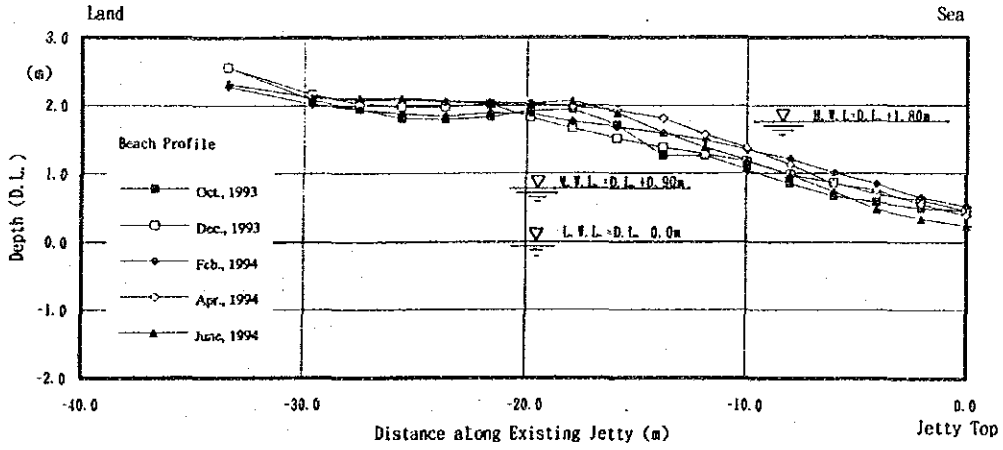


Fig. 2-3-19 Beach Profile Change Along the Jetty

3) Improvement Waorks of the Jeneberan River

The Jeneberan River flowing on the southern side of Ujung Pandang City branches at the estuary delta to the north, central and south channels as shown in Fig. 2-3-20. The north channel near the downtown area of Ujung Pandang was closed at the point where it branched off from the central channel to prevent sedimentation of the Ujung Pandang port. The central channel was also closed for the improvement work in November, 1993 at the point where it branched off from the south channel, and then finally closed in February, 1994 by building a fixed wier at the river mouth to use it as a reservoir.

The south channel, the only remaining mouth for the Jeneberan river, was created by the flood of 1967 and is quite new. The embankment was constructed at the both side of the channel between March, 1992 and February, 1994 as a part of the river improvement works, and the training jetties were constructed at the north and the south of the river mouth in September and November, 1993 respectively. Dredging of the channel to -2.0 m was performed between March, 1988 and December, 1989.

In the upstream of the Jeneberan River, construction of the Bili-Bili Dam is ongoing; the construction was started in February, 1994 and is expected to be completed in 1998. The design flood discharge is 3400 m3/s before construction and 2300 m3/s after completion. The flow load shared by the central and the south channels was 6 : 4 before the central channel was closed.

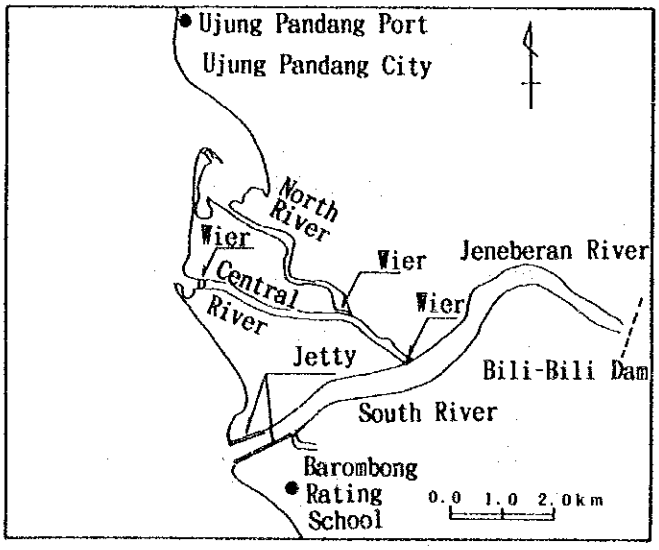


Fig. 2-3-20 Status at the Jeneberan Estuary

The sediment discharge from the Jeneberan River is said to be 400,000 m3/year before construction of the dam, and the sources are the Jeneberan River and the Jenerata River, a branch, supplying the sand at the ratio of 3:1. After completion of the Bili-Bili Dam, the sediment discharge from the Jeneberan will decrease radically to about 1/4 of the current volume. Due to ballast or gravel production of about 400,000 m3/year in the Jeneberan upstream, the river bed is subsiding locally by about 3 m on the average.

It is concluded that the beach in front of the School is not stable because of the radical changes recently occurring in the Jeneberan River due to the improvement works as discussed above and of the consequential changes in the nearby beaches, and that the beach is undergoing a transition period to the equilibrium condition with rapid changes. The following is assumed based on the characteristics of the Jeneberan River.

a. The sediment discharge of the Jeneberan River will remain constant for 5 to 6 years until the dam is completed.

b. The sediment discharge will concentrate in the south channel because of the closing of the central channel. The south channel is nearest to the School and its sediment discharge to the beach is bound to increase.

4) Forecast of Shoreline Changes

The changes in the shoreline in front of the Barombong Rating School were forecasted by taking into consideration the changes in the Jeneberan River and the coastal profile. One-line model which is said to be most applicable for forecasting the long term changes of shoreline was used. The distance of 16.2 km along the coast from the Jeneberan River mouth to the Sangrabengi point was studied.

Fig. 2-3-21 shows the shoreline forecasts 2 years from now, 5 years from now which is immediately after the completion of the dam, and 10 years from now based on the 1994 shoreline.

According to the forecasts, there will be some sedimentation at the river mouth and some advance of the shoreline after 2 years because of a relatively large amount of discharge from the Jeneberan River. In front of the School, the shoreline will advance by about 10 m as the littoral transport from the estuary.

Although the shoreline will somewhat recede on the south side of the jetty after 5 years because the sediment discharge will decrease by construction of the dam, the shoreline in front of the School will advance by about 20 m.

After 10 years, the decreased sediment discharge because of the dam will affect the shoreline to a greater extent and the coast is expected to recede by about 50 m at the estuary. The shoreline in front of the School, however, will continue to advance for the total of about 30 m in 10 years.

The above results indicate that the shoreline in front of the Barombong Rating School will have advanced by about 30 m 10 years from now due to the sediment discharge from the Jeneberan River although we still have problems in precision forecasting as we lack some of detailed field data to verify the numerical simulation model. Sedimentation is expected to progress and the shoreline to advance even after the 10 year period, and the maximum distance of the shoreline advance is expected to be 40 to 50 m. However, there will be areas in the estuary of the Jeneberan River where the shoreline will recede because of the decreased sediment discharge caused by the Bili-Bili Dam. In the long term, this receding of the shoreline will affect the shoreline in front of the School to cause gradual recession.

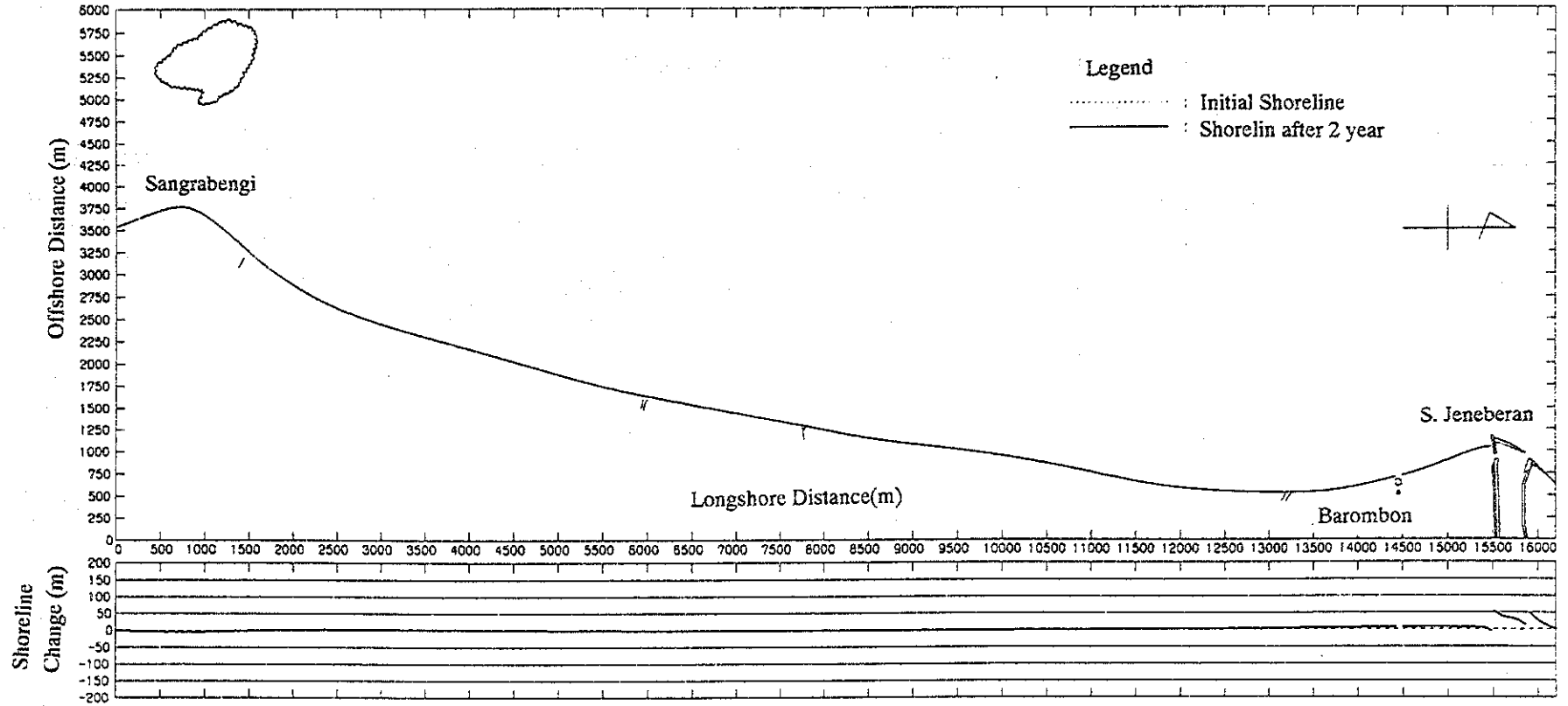


Fig. 2-3-21(1) Forecast of Shoreline Changes (2 years from now)

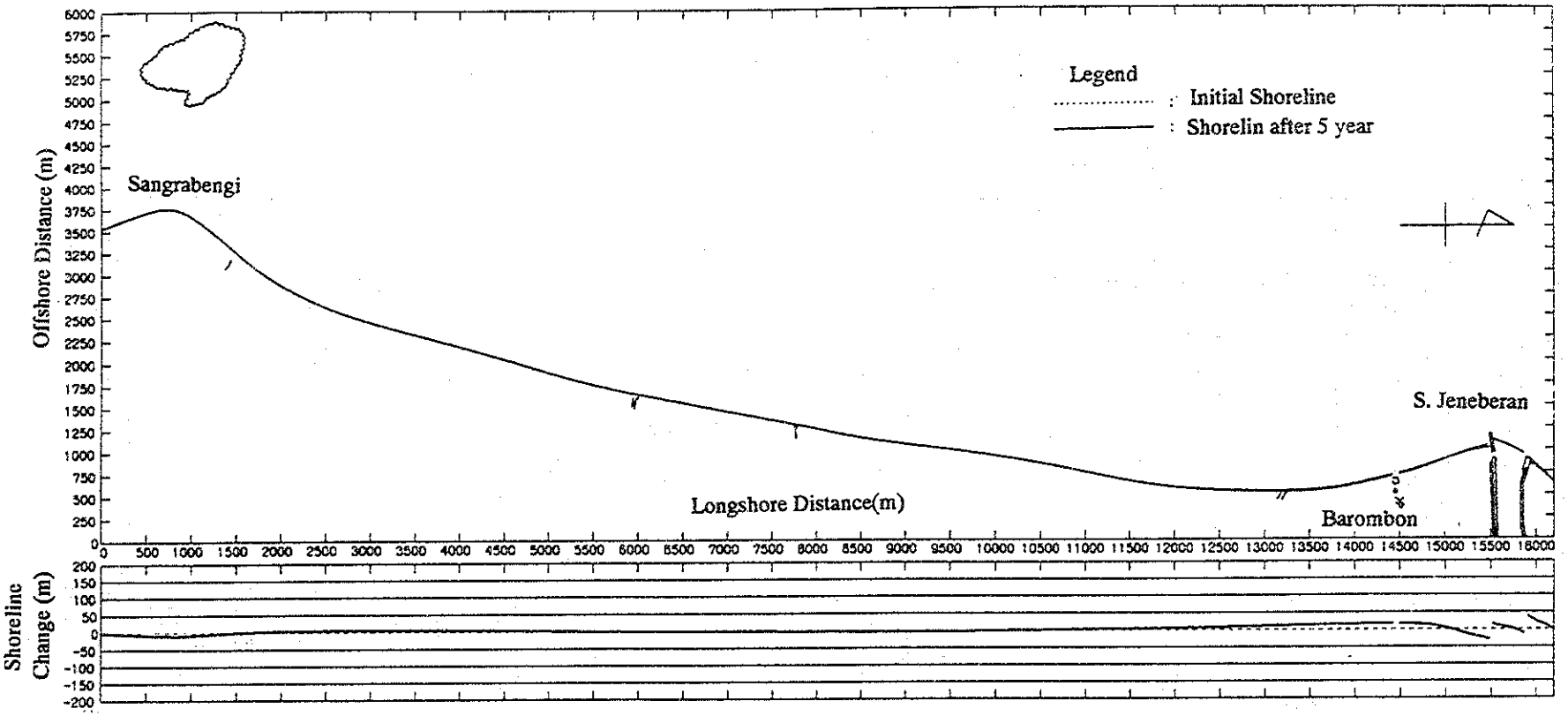


Fig. 2–3–21(2) Forecast of Shoreline Changes (5 years from now)

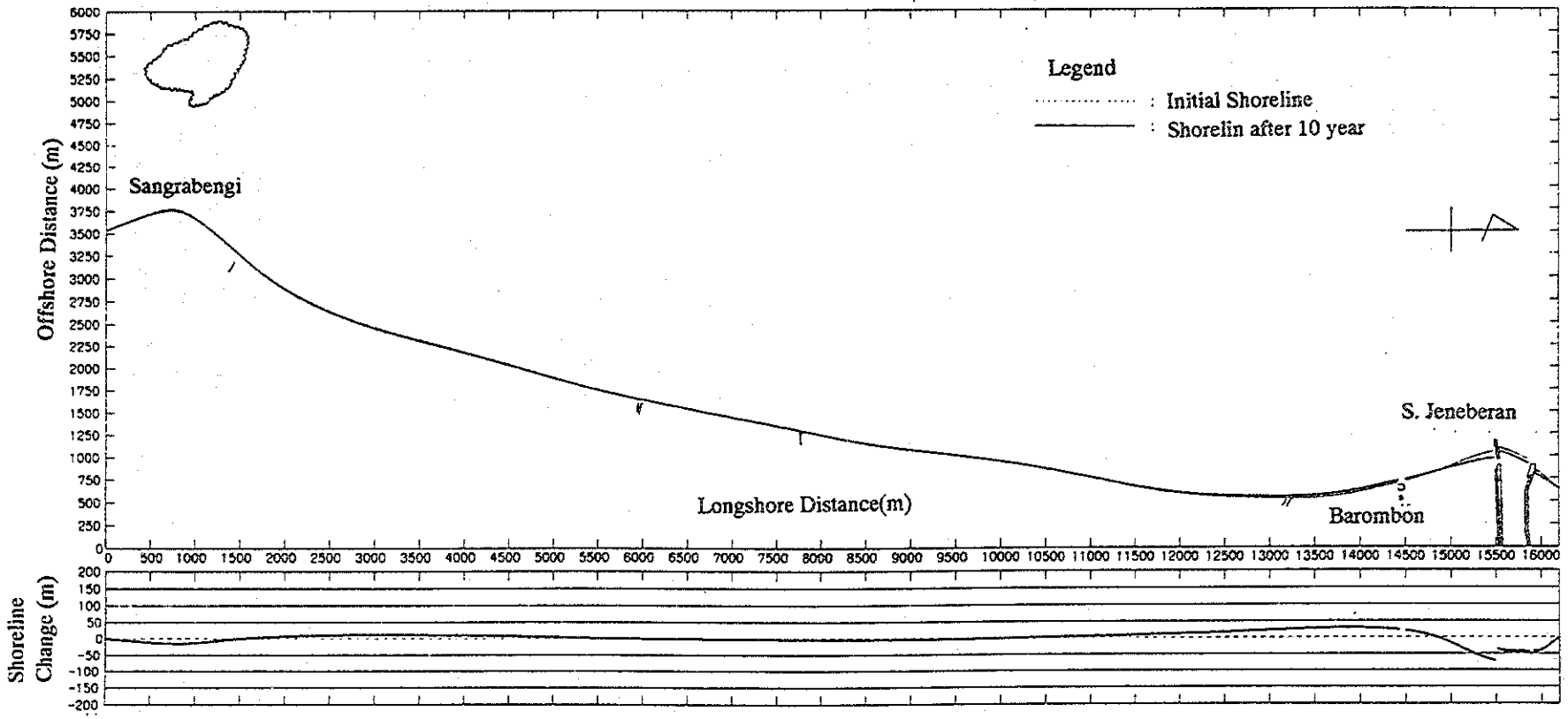


Fig. 2-3-21(3) Forecast of Shoreline Changes (10 years from now)

2-3-5 Infrastructure

(1) Road Conditions

The Barombong Rating School is located at 8 km linear distance to the southwest from the center of Ujung Pandang City. The Barombong District can be reached by taking the trunk road going south from the city for about 15 km and then a branch road to the west for about 7 km. It takes about 1 hour from the city to the School. The trunk roads are in good condition and offers good drive, but branch roads are poorly maintained in some extension and narrow, i.e. about 6 m.

(2) Electricity and Telecommunication

When the School was first opened, there was no power supply in Barombong from the Public Electric Corporation in Barombong and the School had to rely on its own power generators. In December, 1984, the power line extension was completed and the supply started. The School has a substation within the compound and contracts the monthly supply of 196 KVA with the Public Corporation. The power supply is excellent causing hardly any voltage drops or power failures.

There are no problems in communication as the telephone lines are installed.

(3) Water supply

There are no public water supply system in Barombong and the School depends on many wells within the compound for necessary supply of water. Most wells are shallow and collect groundwater in the surface layer. There are one deep well of 100 m depth and one medium well of 30 m to collect confined water stably. The deep well is very small with the depth of about 100 m, the diameter of 1.5 inches and the pumping capacity of 96 litter /min. The medium well often goes dry during the dry season and cannot be used throughout the year.

(4) Project Site

The site for the proposed facilities can be found within the current school ground which is well prepared. There are no problems regarding the site.

The Barombong District where the School is situated is dotted with agricultural and fishing village and there are no densely populated areas in the

neighborhood. There is a bathing beach on the north of the district but the area on the south is not used for any purposes.

2-3-6 Outline of Facilities and Equipments

The design conditions for setting the scope and specifications for the facilities included in the Project are described below.

1) Cutter Training Facility

a. A jetty type structure using pile support will be adopted in order not to disturb the littoral drift

b. The length will be determined by considering the further shoreline change by littoral drift and changes in the sea bottom topography.

c. The facility will have a linear line and berthing posts for cutters and life boats on both sides. The berthing length will be 30 – 50 m long.

d. There will be provided a platform at the top to facilitate turning of the tractor of the boat carrier and other related vehicles.

e. There will be provided a crane device with roof for lifting and launching.

f. The jetty width will be 5 m as a rule and adjusted depending on the design of the structure.

g. There will be provided handrails on both sides of the jetty.

h. Light beacons will be provided to warn off fishing boats navigating at night.

i. A gate to bar the entry will be built at the entrance to the facility.

j. Water supply system and lighting fixture will be provided.

2) New Boat House

a. A new boat house will be built for storage and repair of cutter boats and life boats.

b. The boat house with roof will have an area of about 20 x 25 m.

c. The boat house will have an overhead crane and a hoist to transport boats.

d. The overhead crane will have a height to allow transport of a boat over other boats.

e. There will be a storage space.

3) Survival Training Facility

a. The pool will be about 25 m x 25 m in area and 4.0 m and 1.5 m in depth.

b. The overhead crane and hoist connected integrally with the boat house

will be used to lift or launch the boat directly in the pool.

c. The facility will be built next to the fire fighting training facility.

d. There will be provided a locker/dressing room, shower/toilet room, and a storage space.

e. There will be provided a jumping platform and a davit for life boat.

f. Ground water will be used and a water purifier device will be provided.

g. A pump and a water supply system of the existing deep well will be provided for exclusive use.

h. An apron with a sufficient width will be provided around the pool.

i. Indonesia will conduct a survey on ground water resources, will drill a new well for the facility.

4) Reformation of the Existing Boat House

a. The entire boat house will be converted to a lecture room to replace the current lecture room which uses only a part of it.

b. The existing overhead crane will be removed.

c. An video system will be equipped.

d.The facility will be large enough to accommodate a class of 35 to 40 students.

5) Cutter Boat Transportation Facility

a. An appropriate facility will be provided for transporting cutter boats, etc. from the cutter training facility to the new boat house.

b. A vertical lifting/launching device consisting of an overhead crane and a hoist will be provided at the top of the cutter training facility. The crane and the hoist will be manually operated as a rule.

c. Rails will be laid out for transporting boats from the new boat house to the survival training facility. The rails will be of an embedded type and measures will be taken against immersion in water or by sand.

d. Boat carrier, tractor and suspenders will be provided to transport the boats.

6) Equipments

An open type engine life boat, a davit for life boat and a jumping platform are required for cutter training and survival training.

2-3-7 Maintenance

The facilities and equipments offered under this Project should be maintained well by the Barombong Rating School and be put to efficient use as soon as possible for education and training without impairing their functions and performance.

The facilities under this Project are easy to maintain and can be operated by the current staff after completion. The Household Division of the School will be resposible for repair and restoration of the facilities. The technical staff of the Engine Department can attend to small defects of the facilities without requesting outside help.

Spare parts and future replacements for the proposed facilities and equipments should be those available locally. Only the spare parts that are not available shall be considered in this Project.

CHAPTER 3

BASIC DESIGN

CHAPTER 3 BASIC DESIGN

3-1 Design Policy

The basic design for the facilities for the cutter training, survival training and the related facilities such as the boat house shall be implemented with the following design policies based on the discussions above.

(1) Policy Regarding Natural Conditions

In implementing the basic design, it is important to consider the littoral drift and the soil conditions.

The cutter training facility is to be constructed in the maritime area and should not disturb the littoral drift in order to minimize the influence on the adjacent beaches. Therefore, a pile-type structure will be selected.

As the silt stone supporting base is distributed beneath the soft soil stratum, care should be taken to prevent uneven soil settlement of the structure.

(2) Policy Regarding Social Conditions

Houses in Indonesia are traditionally built of wood and have elevated floors and such buildings are seen in abundance in the surrounding farm area. Some buildings are made of bricks or concrete columns, beams and floor with brick walls. In designing buildings, provision of wide eaves and a large number of windows is important for ventilation and control of room temperature.

(3) Policy Regarding Construction Conditions

Local construction companies and consultants have limited experiences in construction of sophisticated buildings and structures which require high level technology and the degree of their technical skills, mechanization and rationalization is not yet adequate. As the technical level of local contractors would affect the method of construction supervision and the construction period, we shall choose the methods and the materials that are compatible with the local level.

(4) Policy Regarding Local Contractors and Materials

Local construction companies may be asked to employ as subcontractors. Ordinary construction machinery can be procured locally, but special machines or construction craft will be imported as they are not available locally.

Most construction materials for the Project can be procured locally. Cement is readily available from a factory near Ujung Pandang. Good quality sand and gravels for aggregate are also available, but the supply may be limited due to large scale construction works which are currently in progress such as improvement for the Ujung Pandang Port and construction of the Bili Bili Dam. The procurement plan should therefore be prepared carefully. Iron bars can be obtained from local steel mills, but good quality steel piles and other special purpose products should preferably be imported from abroad.

(5) Policy Regarding Maintenance and Operation of the Implementing Organization

The Household Division of the School is doing a good job of maintaining and operating the school facilities. Because of the recent increase of the budget, there is supposedly no difficulty in maintenace and operation for the proposed facilities considering minimum maintenance.

(6) Policy Regarding Selection of Facilities and Equipments

The facilities will have functions needed for implementing the cutter training and the survival training. They should not require complicated maintenance and construction materials and machinery shall be procured locally as much as possible.

(7) Policy Regarding the Construction Period

As there are rainy and dry seasons at site, care should be taken regarding some of the works that cannot be carried out easily during the rainy season. Driving piles for the cutter training facility, in particular, should be performed during the dry season as it includes welding work and crane operation on the sea.

Although construction is expected to be completed in one year, special care should be taken regarding the seasonal conditions in planning the construction work.

3-2 Study and Examination on Design Criteria

The design criteria of Indonesia will be used basically, although Japanese criteria will also be used by modifying them where necessary. The Ministry of Public Works publishes the criteria which are related to the standards of materials, computation for

wooden, reinforced concrete and steel framed structures, and loads and external forces. These standards will be used in setting the loads and the external forces such as wind pressure and seismic forces for designing the structures.

As the regulation for port facilities in Indonesia is based on that of Japan, the jetty design for the cutter training facility will be based on the Japanese criteria with necessary modifications.

3-3 Basic Plan

3-3-1 Layout Plan

Fig. 3-3-1 shows the layout plan for the proposed facilities. The cutter training facility will be positioned in the offshore direction perpendicular to the coast line and extending from the vicinity of the north breakwater of the existing groyne. Anticipating recession of the shoreline in future, the new boat house and the survival training facility will be positioned on the land side of the original coast line which existed at the time the School was opened in 1980.

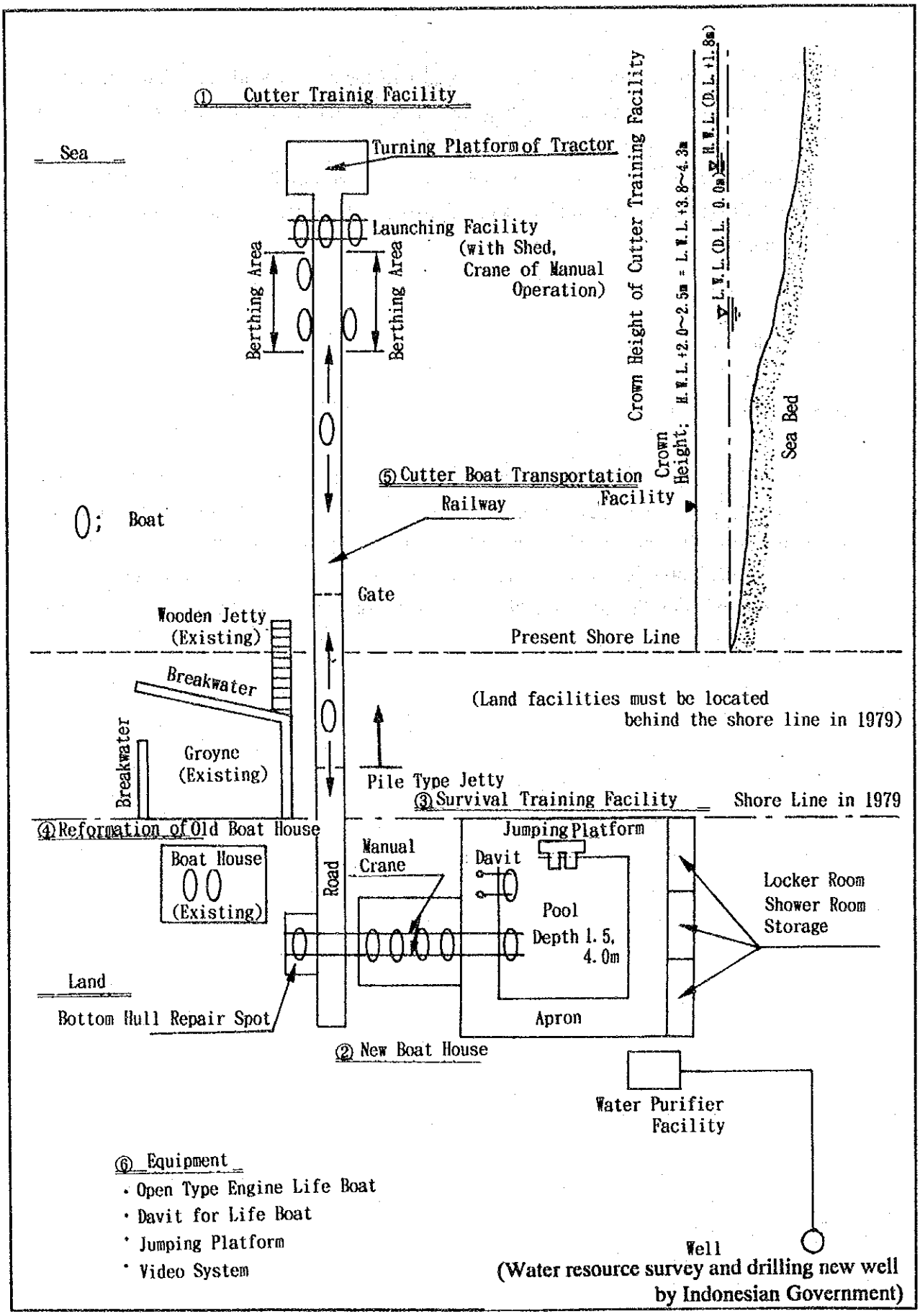


Fig. 3-3-1 Layout Plan for the Proposed Facilities

3-3-2 Plan for Cutter Training Facility

(1) Policy for Determining Facility Dimensions

The length, crown height, crown width and structural type for the cutter training facility shall satisfy the following items.

Length; Length that will secure the necessary water depth for training and on the offshore side of the surf zone; 30 to 50 m will be secured for berthing.

Crown height; Height equivalent to the design wave height from the design H.W.L.

Crown width; The width used for transporting cutter boats and life boats.

Structural type;The type not to disturb the littoral drift.
The structure should facilitate berthing of the training boats and prevent entry beneath the jetty.

Cutter boats and life boats used for training shall be designed with the dimensions given below.

Cutter boat:

Height;	1.67 m
Draft ;	1.00 m (approx. 60% of height)
Width ;	2.63 m
Length ;	9.00 m
Weight ;	1.5 t

Life boat:

Height;	1.69 m
Draft ;	1.00 m (approx. 60% of height)
Width ;	2.95 m
Length ;	8.03 m
Weight ;	2.25 t

(2) Length of Facilities

The water depth needed for the jetty is determined by considering the draft of the cutter boats and the life boats used in design, excursion of the boats due t wave and bathymetric changes which may occur when the shoreline advances by 50 m.

Draft;		1.0 m
Excursion of boat;		0.5 m
Topographical changes;		0.7 m
Allowance;	+	0.3 m
Design depth;		2.5 m

The depth of −2.5 m will be required for the berthing area at the tip of the facility including the launching portion for the training boats. According to the current seabottom topography the area where the necessary depth can be obtained will be 200 meters from the end of the existing jetty as shown in Fig. 3−3−2. The facility will require the length of about 250 m from the end of the jetty assuming the minimum distance of 30 m for the berthing area and 20 m for the launching portion where the lifting device will be installed. This position is on the offshore side of the surf zone of H1/3 = 0.5 m, a comparatively large wave height during normal times, and the sea around there is not likely to present difficulties for training. Although the minimum length of 30 m for the berthing zone was assumed, we understand it would be possible to extend the distance somewhat toward the land side because of including some allowance in depth.

Based on the above, the total length will be 310 m including 50 m for the approach between the tip of the existing jetty and the land and 10 m for the turning platform of vehicles.

Jetty length;		250 m (offshore side of the existing jetty top)
Turning platform;		10 m (at the top of the facility)
Approach length;		50 m (land side from the existing jetty top)
Total jetty length;	+	310 m

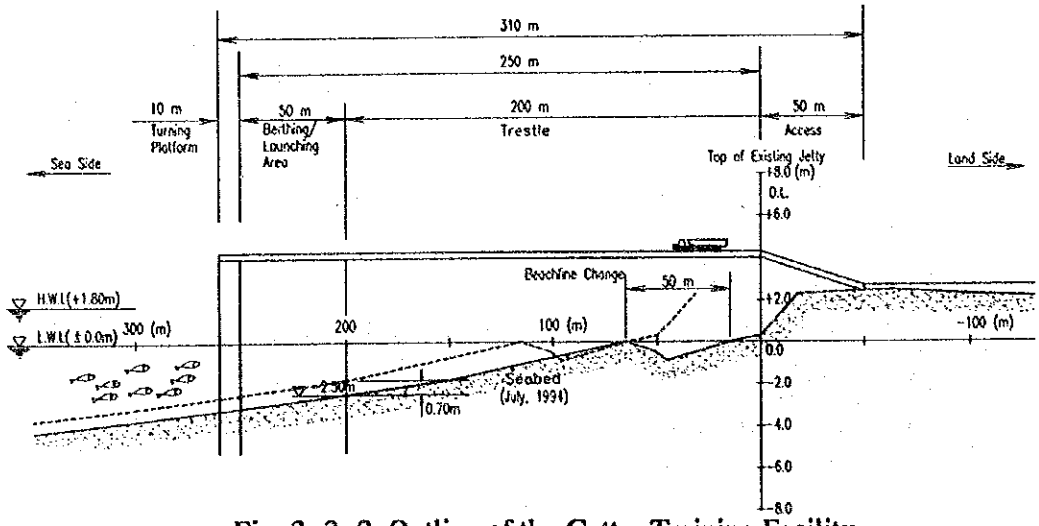


Fig. 3−3−2: Outline of the Cutter Training Facility

(3) Crown Height

The crown height for the facility is determined by adding design H.W.L. and the clearance which is equivalent to the design wave height. The design wave height of the facility is sought by calculating wave transfomation in shallow water area based on the design deepwater waves described in the appendix-6.

Design deepwater wave;	Wave height (H1/3) = 2.2 m
	Period (T) = 5.5 s
Design wave for facility;	Wave height (H1/3) = 1.9 m

The clearance beneath the jetty floor is calculated to be D.L. +4.0 m from the design wave height for the facility, and considering the floor thickness of 0.3 m, the crown height for the facility becomes D.L. + 4.3 m.

Design Water Level;	H.W.L.	D.L. + 1.8 m
Wave height of design wave;		1.9 m
Allowance;		+ 0.3 m
Clearance;		D.L. + 4.0 m.
Floor thickness;		+ 0.3 m
Jetty crown height;		D.L. + 4.3 m.

(4) Crown Width

The crown width of the facility is determined by considering the width of the cutter boat and that of the life boat.

Boat width;		3.0 m
Width of curbing;		0.4 m (0.2 m for one side)
Work space;	+	1.6 m (0.8 m for one side)
Jetty crown width;		5.0 m

(5) Structure Type

Littoral drift is remarkable in the area where the structure will be constructed. An impermeable structure which prevents sand movement or littoral drift will cause large scale of topographic changes to the adjacent beach and the maritime environment. A type pile structure which does not prevent sand movement, etc. is considered most appropriate for a large scale facility in

sandy beaches such as the Project site.

Although concrete pipe or steel pipe piles are conceivable, the latter is considered appropriate because the piles would be supported by the silt stone bottom layer underneath the thick distribution of soft soil stratum which is beneath thin sandy surface layer, and the concrete pipes are not strong enough for driving into the silt stone layer.

Structural type;	Pile structure
Pile type;	Steel pipe piles

If the pile type jetty is used for the facility, training boats may enter beneath the jetty at the time of berthing or mooring, creating dangerous situations. Therefore, a lattice work will be installed on the water surface in the berthing area as shown in Fig. 3-3-3 to secure safety of the training boats. The superstructure for the jetty will be a reinforced concrete structure.

(6) Auxiliary Facilities

Following facilities will be built as auxiliary facilities.

a. A platform for turning tractor of boat carrier and vehicles at the jetty tip
b. A lattice work to prevent entry of the boat in the berthing area
c. Hooks for the Jacob's ladder
d. Mooring bits and rings
e. A gate to bar illegal entry at the entrance
f. Light beacons and security lights for ships navigating at night
g. Handrails and car stops for safety purposes
h. Water supply at the entrance

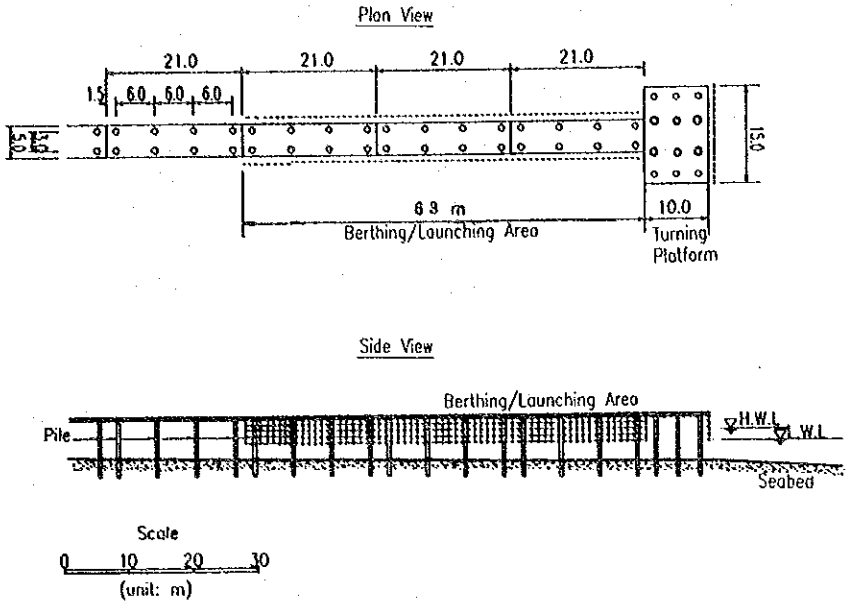


Fig. 3-3-3 Schematic Drawing of Cutter Training Facility

3-3-3 Plan for New Boat House

(1) Policy for Determining Dimensions of Facility

The new boat house will store the cutter boats and the life boats, and will have exterior walls and a door. A manually operated overhead crane will be provided at a height which will allow carrying a boat overhead to facilitate position changes of boats within the boat house. A supply storage will be provided inside.

Repair work of the boat will be carried out inside as a rule. However, cleaning the bottom hull or painting should preferably be done outside and a space for repairing the bottom hull will be provided in front of the boat house and the crane will be extended outside to facilitate moving of the boat.

Number of boats;	Four (4)
Type of boats;	Cutter boat and life boat

(2) Required Area

The area required for the boat house is calculated based on the width and length of the cutter and the life boats to be housed. Considering the open spaces needed for working, and installing the boat racks based on the widths and

lengths of respective boats, the width and length required for a boat are as follows.

		Width		Length
Cutter boat		2.63 m		9.00 m
Life boat		2.95 m		8.03 m
Min. requirement		3.00 m		9.00 m
Open space	+	3.00 m	+	3.00 m
Proposed dim.		6.00 m		12.00 m

Boats will be arranged in parallel, allowing 4.0 m for the supply storage and the work space each in the front and the back. Thus, the following dimensions are set for the boat house.

Width;	6.0 m x 4 boats = 24.00 m
Length;	12.0 m + 4.0 m x 2 = 20.00 m
Area;	20.0 m x 24.0 m = 480.00 m2

(3) Hull Bottom Repair Spot

The area required for repairing the bottom hull is determined by considering the dimensions of the cutter boats and the life boats and the space needed for work.

		Width		Length
Dimensions of boat		3.00 m		9.00 m
Space needed for work	+	4.00 m	+	3.00 m
Space required		7.00 m	x	12.00 m
				= 84.0 m2

(4) Overhead Crane

The overhead crane will be manually operated and will have the following capacity. The boats will be suspended at two points in the front and the back, but the crane will have enough capacity to allow suspension at only one point considering the safety.

	Weight
Cutter boat	1.3 t
Life boat	2.25 t
Max. weight	2.25 t
Proposed capacity	3.00 t

The crane height will be set considering the height of the boats and the height needed to carry a boat overhead, the height of suspender and clearance.

Height of overhead crane; 5.5 m

(5) Structure

The roof, columns, beams and floor will be of the reinforced concrete structure similar to the old boat house and the walls will be of bricks with plaster.

(6) Construction Materials

Reinforced concrete, bricks and plaster can be procured locally. Fixture can also be procured locally as a rule.

(7) Auxiliary Facilities

Following auxiliary facilities will be installed.

a. Storage for machinery, equipments and repair tools

b. Electricity and water supply facilities

3-3-4 Plan for Survival Training Facility

(1) Policy for Determining Facility Dimensions

As the survival training facility (pool) is intended for training using life boats and rafts, training for jumping into the water from height, swimming while donning a life jacket, and floating on the water without a life jacket, etc. The dimensions are to be set considering the boats used, the content of training, and the number of persons who will use the facility. A overhead crane will be extended from the new boat house to carry in and out the boats and rafts.

The ground water quality has been tested and confirmed to create no problems of water supply for the pool.

Planar dimensions;	the space will be large enough for a class of students engaged in training for keeping afloat without a life jacket and training using a life boat
Water depth;	the depth will be sufficient for trainees to jump in with a life jacket, and deeper than the draft of the boat

Water quality; Fresh water (from a well)

(2) Planar Dimensions

As the students will be trained to keep afloat in the pool without a life jacket, the pool should be large enough to accommodate a class of 35 to 40 students.

Number of students;	35 – 40
Area per student;	4.0 m x 4.0 m = 16 m2
Area of the pool;	560 – 640 m2
Length of the pool;	25 m (625 m2)

As 25 m is about three times the length of a cutter or a life boat, use of a boat in training will also be possible.

(3) Water Depth of the Pool

The pool will have the two water depths, i.e. shallow and deep, as there will be training for safely jumping from a height into the water in addition to training in the water, considering the request.

The deeper area will have the depth equivalent to the jumping platform, 4 m above water, for training by jumping from a height while donning a life jacket. The shallow area will have a depth that will allow students to stand on their feet for safety.

Area	Water depth
Deeper area;	4.0 m
Shallower area;	1.5 m

(4) Structure Type

A reinforced concrete structure will be used for the survival training facility. The pile foundation was required because the pool has two cross sections, i.e. deeper and shallow areas, uneven settlement due to consolidation of soft soil is anticipated, and because of buoyant force is anticipated to act on the structure due to its great water depth and the high groundwater level.

Structure;	Reinforced concrete structure
Foundation;	Pile foundation

(6) Auxiliary Facilities

Following facilities will be built as auxiliary facilities.

a. Water purifier device
b. Jumping platform
c. Davit for life boat
d. Dressing and locker room
e. Shower and toilet room
f. Storage
g. Restoring, pump and water supply system of the Existing deep well
h. Ground water survey, drilling a new well will be conducted by Indonesia
i. Security light, etc.

3-3-5 Reformation of the Existing Boat House

(1) Policy for Determining Facility Dimensions

The existing boat house will be converted to a lecture room in order to make up for the lack of such spaces. The education and training programs required by the STCW Convention, those which are not conducted in the cutter training facility and the survival training facility will be conducted in the new lecture room near the beach.

It will accommodate one class of 35 – 40 students, and will be provided with a video system for audio-visual education, and an exhibition space for a outfitting of a life boat, a life raft, etc. As the existing boat house is not provided with sufficient toilet and it is far from the school building, a toilet will be included in the auxiliary facilities.

(2) Scope of Reformation

The existing boat house is an open type structure having only the roof, and is partly used currently as a lecture room. The need has outgrown the space and therefore the entire boat house will be converted to the lecture room. The overhead crane will be removed as it will not be needed any longer. Fig. 3-3-4 shows the roof and location of the columns.

Dimensions of the existing boat house;

Roof area;	13.5 m x 22.5 m = 303.75 m2
Area surrounded by columns;	8.2 m x 17.2 m = 141.04 m2

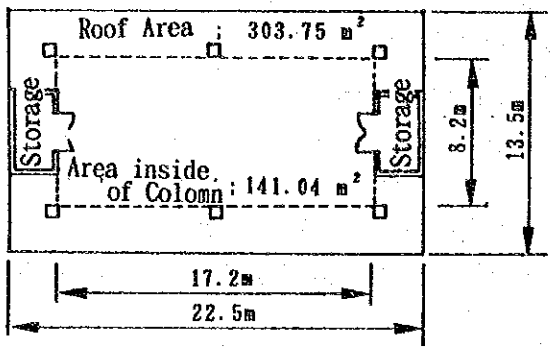


Fig. 3-3-4 Roof Size and Location of Columns of Existing Boat House

The lecture room area was calculated by assuming that 6 x 7 rows (42 seats) of desks will be provided for a class of 35 – 40 students. The desk used for calculation is 60 cm x 40 cm big.

Depth of the class room;

Distance between the wall and the first row;		170 cm
(Distance between two rows + depth of a desk) x 7 rows;		630 cm
(50 cm+ 40 cm) x 7		
Distance between the wall and the last row;	+	60 cm
Depth of the room		860 cm

Width of the class room;

Distance between the wall and the first row x two sides		120 cm
60 cm x 2 sides		
Width of a desk x rows		360 cm
60 cm x 6 rows		
Distance between two desks x (rows – 1)	+	200 cm
40 cm x (6 rows – 1)		
Width of the room		680 cm

Based on the above, the lecture room for a class of 35 – 40 students is 8.6 m deep and 6.8 m wide. As the area enclosed by the columns is 17.2 m deep and 8.2 m wide, a space for the class room and for exhibiting the outfittings can be allocated by renovating the area enclosed by columns.

(3) Structure

The structure of the existing boat house will be used and the walls will be finished with brick and plastered.

(4) Construction Materials

Bricks and plaster are the only materials needed and they can be procured locally. Fittings for reformation can also be procured locally.

(5) Auxiliary Facilities

Following facilities will be provided.

a. Lighting and power supply equipments
b. Toilet room, etc.

3–3–6 Cutter Boat Transportation Facility

(1) Policy for Determining Facility Dimensions

An optimum facility to transport the cutter boats and the life boats from the cutter training facility to the new boat house will be installed.

(2) Crane and Railing for Cutter Training Facility

The overhead crane with roof will be installed for launching and lifting the cutter boat and the life boat. Its capacity will be the same as that to be provided in the new boat house. The height of the crane will be determined by considering the heights of the cutter and life boats, boat carrier, suspenders and clearance.

Boats to be carried;	Cutter boat and life boat
Capacity of the crane;	3.0 t
Height of the crane;	4.6 m

The rails will be laid to facilitate transport of the training boats over the entire length from the tip of the cutter training facility to the new boat house.

(3) Approach Road

The approach from the end of the cutter training facility on the land side to the new boat house will be provided with the above rails and paved with concrete.

(4) Boat carrier, Tractor and Related Machinery

There will be provided a boat carrier and a tractor for transporting the cutter boat and the life boat, a suspender for hoisting the boat to the crane and boat racks for fixing the boat during the storage.

a. Tractor (16 HP)	One	
b. Boat carrier (including adapter for the tractor)		One
c. Boat suspender (including an adapter)	One	
d. Boat racks	Five	

(5) Auxiliary Facilities

Following auxiliary facilities will be provided.

a. Lighting appliances for the launching overhead crane in the cutter training facility, etc.

3-3-7 Equipment Plan

(1) Policy for Choosing Equipment

Those required for the cutter training and the survival training will be provided.

(2) Equipments

The following items will be planned for the education and training equipments. The launching operation of the life boat on the water as required by the STCW Convention cannot be performed, because the life boats currently in use at the School are becoming obsolete. A open type engine life boat will be provided to meet the requirement.