As regards the Palembang area and surroundings as well as the Cilacap area, there exist substantial oil refinery activities which leads to substantial oil shipping activities from Palembang and Cilacap. Therefore an On-shore Base is required at Palembang and Cilacap.

6.3.2 Marine Disaster Prevention Unit

(1) Marine disaster prevention unit

It is advisable to establish the Maritime Disaster Prevention Units, under KPLP units at the respective ports stated in Section 6.3.2 in order to carry out the uniform operations for preventing and controlling marine disasters.
The allocation and stockpiling for the minimum necessity and requirements should be made at the control bases for the maritime safety rescue ships, equipment and materials as well as the personnel so that they may be deployed according to the real time operations.

The main services to be performed by the Maritime Disaster Prevention Unit will primarily cover the following:

a. Measures to prevent marine disasters from occurring and spreading
b. Mobilization of the maritime safety rescue ships possessed, the equipment and materials stockpiled
c. Training pertaining to maritime disaster prevention
d. Research and study on the technology required for marine disaster prevention

(2) Maritime Safety Rescue Ships, Equipment and Materials

The number and quantity of maritime safety rescue ships, equipment and materials to be expected for the possession and stockpiling at the units are planned so as for them to be able to meet the minimum requirements.

A plan is made that one each of maritime safety rescue ship is to be allocated to each of the Disaster Prevention Units.

(i) Maritime Safety Rescue Ships

a) Operational Mission

The operational missions of maritime safety rescue ships are as given below:

a. To control the combatting operations as the commanding ship on scene with the on-scene commander on board, dispatched immediately after the accidents
b. To fight and control the fire
c. To tow the oil recovery ship
d. To carry out spraying operations of chemical dispersant
e. To execute on-site detection of inflammable gas and measure oxygen density

b) Main installations

The following main installations will be required on board to carry out the missions:

a.	On-scene command and control room	
b.	Controllable pitch propeller	
c.	Foam concentrate tank:	2 kℓ
d.	Chemical dispersant tank:	70 kℓ
e.	Dry chemical powder tank:	2 tons
f.	Fire gun	3,000 ℓ/minx2 units
g.	Fire gun for dry chemical powder:	35 kg/sec. x 1 unit
h.	Work boats	2
i.	Self-protection water curtain:	1 set

c) Fire-fighting devices

a.	Smoke helmets	30 sets
b.	Fire proof clothes	30 sets
c.	Fire proof shoes	30 sets
d.	Gas masks	15 sets
e.	Fire proof gloves	30 sets
f.	Life lines	15 sets
g.	Breaking tool	5 sets
h.	Stretchers	5 sets
i.	Air breathing apparatus	5 sets
j.	Spare cylinders	5 sets

d) Detector

a.	Inflammable gas indicator Portable type	2 sets
b.	Oxygen density meter	2 sets

e) Handy oil recovery devices

a.	Work clothes	10 pieces
b.	Work cap	10 pieces
c.	Full-length rubber gloves	10 pairs
d.	Full-length rubber boots	10 pairs
e.	Holed ladle	10 pieces
f.	Scoop net	10 pieces
g.	Submersible pump	4 pieces
h.	Spilled oil recovery net	1 set
i.	Oil absorbent	2 packs

(3) Disaster combatting operations

Due to the specific nature of missions of maritime safety rescue ships, it is desirable to take the following into consideration so as to deploy their full capacity as an effective means of controlling the marine disasters in their starting stage before they develop into a large scale one.

(i) Area of operation

The water areas within which maritime safety rescue ships are ordinarily operated should be where frequent occurrences of accidents are expected with reference to the responsible areas of operation covered by KPLP units.

(ii) Operation procedures

a) The heads of the maritime safety rescue units should place emphasis, under normal operational status, on watching any possibilities of creating fire casualties at the time of arrival and stevedoring of dangerous cargo vessels such as large tankers, etc.

b) Those personnel should operate the maritime safety rescue ship together whenever they operate the oil recovery barge in order to tow the latter, to expand oil booms, to provide support for oil recovery works, to be in charge of telecommunications and so forth.

(iii) Maintenance procedures

a) The heads of the disaster prevention units should carry out the routine and scheduled maintenance and checking for the maritime safety rescue ships.

b) They should always be prepared for ready dispatch of the ships even during the maintenance and checking works.

c) They should make sure that in the case of maintenance for the main engines, both of them will not be simultaneously placed under non-workable conditions.

d) They should be responsible for carrying out the training for the personnel under their command to acquire the theory on disaster prevention, the operation procedures of maritime safety rescue, especially the practical combatting training of handling fire guns, spraying chemical dispersant, deploying oil booms, operating oil skimmers and so on through repeated drills.
They should also make effort to improve the expertise skill of their personnel through various training to be ready for coping with any emergency situations with the reduced number of personnel.

7 Maritime Safety and SAR Communications and Information System

7. 1 Present Situation

7. 2 Long-term Development Plan

Section 7 Maritime Safety and SAR Communications and Information System

7.1 Present Situation

7.1.1 Maritime Safety and SAR Communications

7.1.1.1 Communications Facilities

There are fifty-five coastal radio stations dealing with the public communications as shown in Fig. 7-1-1. The general message flow chart of distress messages is as shown in Fig. 7-1-2. The maritime SAR telecommunications system is presently being established through the first phase implementation of the project to be completed in June, 1989. The system structurally comprises the overall networks linking KANWILs and DGSC utilizing the existing public communications networks, and the area communications covering mainly KPLP unit within the individual KANWIL areas. The inter-KANWIL communications are primarily through the HF point-to-point networks, and the area communications are basically TDMA where practicable through 2 GHz.

The links are also extended to the BASARNAS organizations for its national SAR coordination.

BASARNAS by cable
3 x KKR by 2 GHz VHF
6 x SKR by 2 GHz VHF and cable

The SAR Operation Consoles are installed at each KANWIL as well as at DGSC and KPLP units for the direct command and control of the SAR ships including the Fleet. Within each Area, the communications networks are established through installation of the exclusive use telephone system.

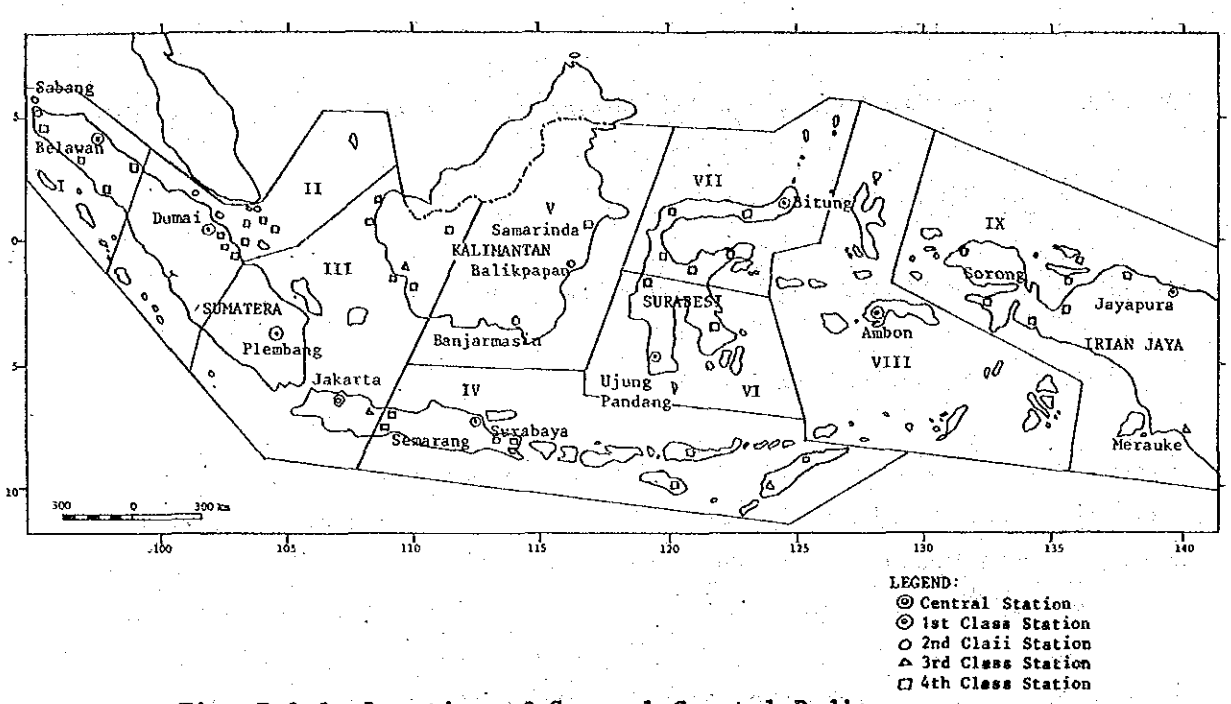


Fig. 7-1-1 Location of General Coastal Radio Stations Dealing with Public Communications

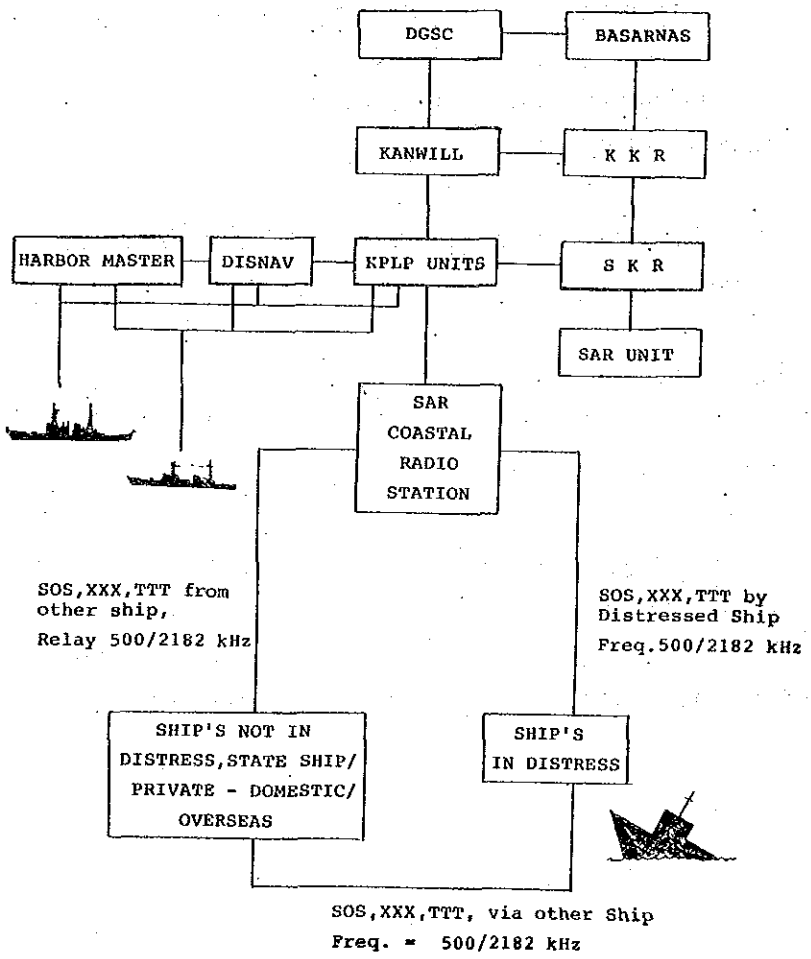


Fig. 7-1-2 General Flow of Distress Messages

(1) SAR Operation Communication System

Distress signals transmitted from a ship in casualty at sea or from other ships in the vicinity will be received at the radio receiving station through distress frequencies such as channel 16 Marine VHF, 500 kHz and 2182 kHz. The information on the receiving distress signal is to be conveyed from the receiving station to KANWIL and KPLP units by telephone through multiplex communication system immediately.

(2) Command and Control Communications System

SAR operations will be commenced at SAR Operation room in KANWIL or KPLP units immediately after receiving the distress information from the radio receiving station. The Order of Command Control will be transmitted to SAR ships for their activities from SAR Console in KANWIL through remote controlled HF transmitter in the radio transmitting station and remote controlled receiver in receiving station for long distance communication. In the case of SAR operation in short distance from shore, command control communications will be executed at KPLP units through remote controlled marine VHF transceiver in the radio receiving station.

The systematic diagram of command and control links is shown in Fig. 7-1-3.

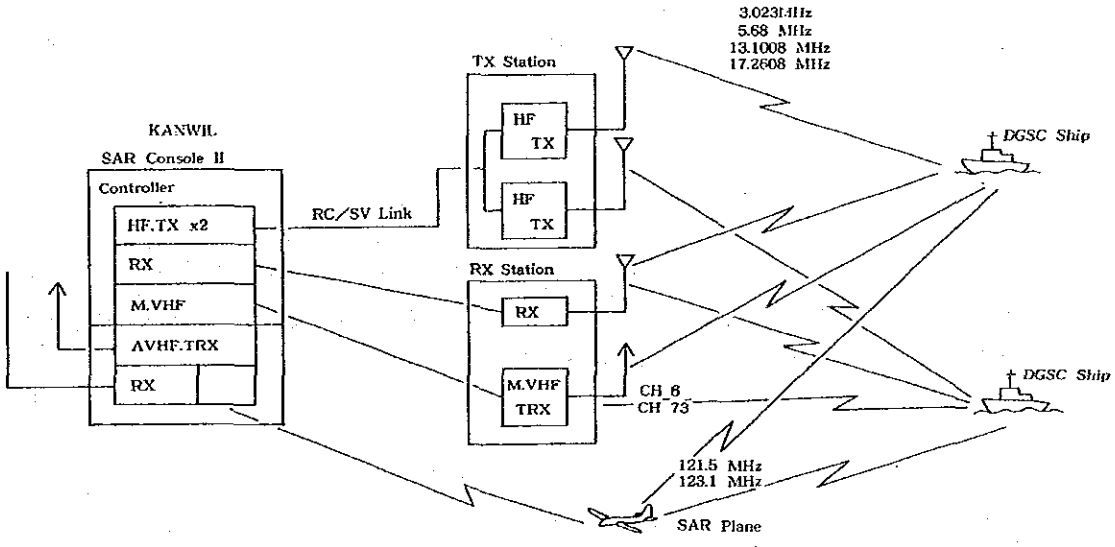


Fig. 7-1-3 Systematic Diagram of Command Control Communication Links

(3) SAR Coordination Communications System

Necessary information for SAR Coordination will be exchanged between SAR operation room and the relevant offices, such as SKR, KKR, BASARNAS, Meteorological office and so on by telephone through multiplex communication system or VHF radio link.

(4) SAR Console

The SAR consoles are installed at DGSC HQ, KANWIL and KPLP unit for communications with the relevant ships and also with aircraft in some areas. The SAR Consoles are equipped with necessary remote control equipment for transmitters and receivers including marine VHF and other necessary equipment to be required for SAR operations.

7.1.1.2 Operational Function of System

The maritime SAR communications networks are divided generally into following main systems,

a) SAR operation communications system
b) Command/Control
c) SAR coordination

For the utilization by three systems above the following subsystem of networks are to be established:

(1) Within-Area Communications:

Direct telephone contact is to be established between the relevant offices via Local Exchanger (LOX) by dialling the pre-assigned telephone codes through wire and/or multiplex radio link.

(2) Inter-Area Communications:

Telephone contact may be established with the relevant offices in other Areas by requesting, through direct dialling, the radio operators at the radio stations via Lox, using wire or multiplex radio link, for connection with the counterpart radio stations, and the radio operators at counterpart coastal radio stations are to connect to the relevant offices as requested through direct dialling. Prior to making requested connection, the operators at both radio stations make adjustment of the HF link to the best conditions.

(3) Long Range On-shore Mobile Communications

For Command Control Communications, operator in KANWIL Console will be able to communicate with SAR ship by using remote control facilities and transmitters and receivers in the radio station through multiplex communication system.

(4) Short Range On-shore Mobile Communications

Communications via remote controlled marine VHF TRX in the radio receiving station are to be carried out. VHF equipment have been installed in the Gateway port areas.

7.1.1.3 *Communications Facilities of SAR Related Organizations*

The National SAR Agency (BASARNAS) coordinates all the SAR activities on the national basis through its subordinate organizations of Rescue Coordination Center (KKR) and Sub Rescue Coordination Center (SKR). Therefore, development for the equipment together with the personnel play a vital role in materializing successful SAR operations. The communications facilities and installations presently installed are limited in the quality and quantity.

Since this Study covers the maritime sector, necessary installations should be planned for a consolidated system linked with the communications and information hierarchy of DGSC.

7.1.1.4 Command and Control of Operational Maritime SAR and Coordination

The operational function of maritime safety and SAR activities is one of the important tasks of DGSC, and the Directorate of KPLP is vested with this responsibility. The information on distress and other important messages, upon their receipt, is immediately transferred to the relevant organizations for their action as shown in the general flow of important messages (Fig. 7-1-2).

BASARNAS and its subordinates, KKR and SKR, act as the SAR coordinator on both central and regional levels. The Regional SAR coordination Forum (FKSD) is presently in its growing stage to coordinate the SAR potentials regionally available. The communication networks and links presently available for the operation and coordination are not in a satisfactory condition. It may be generally said that the organizational tree and structure themselves for maritime safety and SAR have been established. However, the operational aspect in terms of human and physical resources still needs to be developed and largely improved.

7.1.1.5 DGSC Management Information System (MIS)

The wide range of activities of DGSC in terms of geography, administration and operation necessitated the establishment of the Management Information System (MIS) for efficient control and monitoring of the DGSC operation, thus considerably decreasing the administrative work. MIS covers ships and cargo movements and port operation as well as management of development project, finance and personnel. The maritime safety sectors of MIS should have access to the maritime SAR information and communications system for the management of the information including the Traffic Control System.

7.1.2 International Movement in SAR Communications

The present maritime distress and safety system has been developed through a long maritime history and based on records of useful experiences accumulated for the purpose of securing the safety of life and property at sea, and thus greatly contributed to rescuing so many lives in the port.

However, the present system has various problems such that there may be situations whereby direct communications between a ship and a on-shore station and even ship-to-ship communications can not be established. The present system is also based on the communication by ear and therefore involves with the problems of efficiency and reliability.

Furthermore, probable situations may occur where transmission of distress signal may not efficiently function at the time of sudden accident.

The Global Maritime Distress and Safety System (GMDSS) will enable every ship to be able, irrespective of the area it operates, to receive the navigation safety information, and to instantly ask the SAR authorities and the ships in its vicinity for help in case of emergency.

7.1.2.1 Basic Concept of the Global System

The communication system of GMDSS is as shown in Fig. 7.1.1 (refer to Final Report).

(1) When a ship is in distress, a satellite EPIRB on board the ship will automatically alert the distress defining the position to the SAR authorities for immediate action via the Local User Terminal (LUT), the on-shore station of a near polar-orbiting satellite COSPAS/SARSAT system operating in the 406 - 406.1 MHZ frequency band.

(2) The INMARSAT satellite system operating in the 1.5 and 1.6 GHz bands will provide a means of alerting from ships by using ship earth stations or satellite EPIRBs and a capability for two way communications using radiotelex and optionally radiotelephone.

(3) Terrestrial communications will provide a means of alerting from ships by using 4, 6, 8, 12 MHz of HF bands for medium range, and the Channels 70 and 16 of VHF bands. The terrestrial communications will also provide a means of two-direction communications.

(4) The information concerning safe navigation of ships at sea will also be provided using radiotelex by NAVTEX, etc.

The major characteristics of GMDSS are as given below.

(1) Ships of Participation in GMDSS

The ships to participate in this system will be:

(i) All passenger ships and carry ships of 300 gross tons or over engaging in international voyage.

(ii) Other ships intending for participation including fishing vessels and private craft.

(2) Functions of GMDSS

The following functions will be incorporated:

(i) Distress alerting
(ii) SAR co-ordinating communications
(iii) On-scene communications
(iv) Locating signals
(v) Preventive actions such as dissemination of marine safety information

(3) Communication System

The communication system is divided into the following:

(i) Satellite System
- INMARSAT SES, EPIRB
- COSPAS/SARSAT; LUT, EPIRB

(ii) Terrestrial System
- HF ; DSG, NBDP and telephone
- MF ; DSC, NBDP and telephone
- VHF ; DSC and telephone
- Micro wages; Radar transponder
- SAR communication networks

The core communications system as a nucleus of the global system has already been in operation in the U.S., Europe and other areas. The establishment of the system is under progress in Japan. In order to carry out the efficient and smooth execution of search and rescue services covering the huge water areas of Indonesia and also to meet the international requirements as the largest archipelago for the Government of the Republic of Indonesia to introduce the global system into the national maritime SAR system.

7.1.2.2 Designation of Sea Area

In view of the recognition that radio communication systems have individual limitations in terms of geographical coverages and services to be provided, the operational performances ingerent to each system will be dependent on the ship's area of operation.

The Areas 1 to 3 provided for in GMDSS (refer to Final Report) may be geographically applied to Indonesia waters.

(1) Sea Area 1

A plan will be made to provide the coverages for the main ports. There are a number of the VHF stations already in operation in and around the ports in Indonesia, and those situated at the main ports should be equipped with the DSC.

(2) Sea Area 2

A plan will be made to provide the coverages approximately covering the main water areas. The coast stations handling with SAR messages via MF are allocated throughout the Indonesian coasts, and they should be equipped with the installations of NBDP and DSC.

(3) Sea Area 3

A plan will be made to have the installations of DSC and NBDP for SAR and also to use the INMARSAT system for the same purpose. The existing HF coast stations handling with maritime SAR messages should be equipped with the NBDP and DSC from the viewpoint of the economical burden which may be released to a great extent since user changes like the INMARSAT system's are not to be incurred.

7.1.2.3 Satellite Systems

(1) INMARSAT System

The INMARSAT satellite system geostationary satellites operating in the 1.5 and 1.6 GHz bands, will provide a means of alerting for ships by using ship earth stations (SES) or satellite EPIRBs and a capability of two-direction communications. The satellite EPIRBs are capable of being activated manually and automatically on floating free from a sinking ships. In the Area 3, the INMARSAT System may be used. The coverage of INMARSAT Satellites is as shown in Fig. 7-1-4.

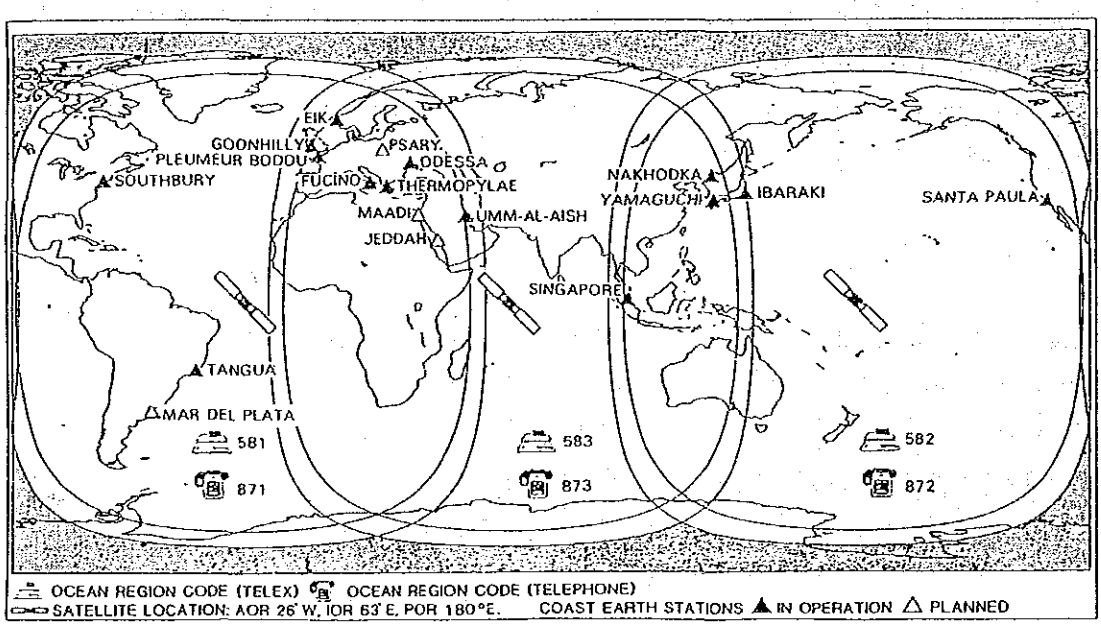


Fig. 7-1-4 Coverage of INMARSAT Satellites
(0° and 5° elevation contours)

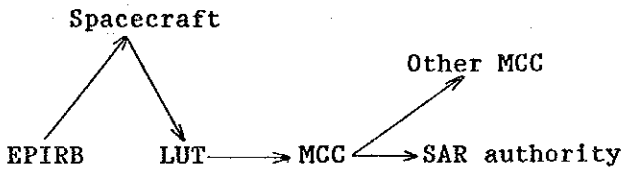
(2) COSPAS-SARSAT System

The COSPAS-SARAT system is a satellite-aided search and rescue system designed to locate distress beacons transmitting on the frequencies 121.5 MHz and 406 MHz intended to serve all SAR responsible organizations in the world whether a distress occurs at sea, in the air or on land.

Decision has been made by IMO that the float-free satellite EPIRBs should operate on the 406 MHZ frequency in the COSPAS-SARSAT system and their carriage should be mandatory in the GMDSS. The distress beacons transmit alert signals, and COSPAS-SARSAT polar-orbiting satellites detect the beacon signals, which are relayed to a ground receiving station termed a Local User Terminal (LUT).

LUT processes the alert beacon signals received to determine the location of beacon, and then the alert is relayed to the appropriate SAR authority via a Mission control Center (MCC) for immediate SAR activities. The COSPAS-SARSAT system comprises the four basic sub-systems of;

- Alerting beacons,
- Spacecraft,
- Local User Terminal (LUT), and
- Mission Control Center



(i) Beacons

The beacons will include a digitally encoded message, identification of vessels or aircraft, nature of distress and so on. A homing device can be optionally integrated with the 406 MHz beacons for homing purposes.

(ii) Space Segment

The SAR instrumentation of the COSPAS and SARSAT spacecraft operates in the following modes:

- Realtime transmission mode;	121.5 MHz repeater
- Realtime mode;	406.025 MHz data processing and downlink
- Global coverage mode;	406.025 MHz stored data transmission

The equipment consists of:

- 121.5 MHz receiver
- 406.025 MHz receiver/processor and memory unit, and
- 1544.5 MHz transmitter down link

(iii) Local User Terminal

The LUT receives the beacon signals down-linked from the spacecraft for their process and relay to the relevant MCC. When the signal is received the processing of each band is accomplished according to the specific capabilities of the LUT. For the 121.5 MHz signal, each transmission is detected and the Doppler information is calculated to determine the beacon location. For 406 MHz data received from the satellite memory on each pass can be processed within a few minutes of passes completion.

(iv) Mission Control Center (MCC)

The MCC is to collect, store and sort the data from LUTs and other MCCs for data exchange within the system and to SAR networks. The MCC is necessary to operate the LUTs.

7.1.2.4 Terrestrial System

(1) Long Range Service

The long range service will be covered by HF (4, 6, 8, 12 and 16 MHz) for ship-to-shore and shore-to-ship directions. The INMARSAT will be used as an alternative where the coverages are available. Distress alerting and safety calling will be made by DSC. Distress and safety communications following DSC will be made by radiotelephoning or NBDP or both.

(2) Medium Range Service

The medium range service will be covered by 2187.5 kHz, 2182 kHz and 2174.5 kHz, and near 500 kHz and 518 kHz.

2187.5 kHz; distress alerts and safety calls by DSC
2182 kHz ; distress and safety communications by radio-telephoning
2174.5 kHz; distress and safety communications by radiotelex (NBDP)
518 kHz ; navigational and meteorological warnings in NAVTEX

(3) Short Range Services

The short range service will be covered by VHF:

156.525 MHz (Ch 70); distress alerts and safety by DSC
156.8 MHz (Ch 16) ; distress and safety communication by radio-telephony

7.1.3 Ship Reporting System

The ship reporting system is a system efficient for search and rescue which periodically receives the information on ships position for the storage in data processing unit, and outputs the necessary data for prompt establishment of search areas and finding of rescue ships nearby a ship in distress the operation are as follows:

- AMVER: (Automated Mutual-assistance Vessel Rescue System) in the U.S.
  Ships all over the world may participate.

- AUSREP: (Australian Ship Reporting System) in Australia
  Ships in and around Australian Waters may participate.

- JASREP: (Japanese Ship Reporting System) in Japan
  Ships in JASREP areas may participate.

- INSPIRES: (Indian Ship Position and Information Reporting System)
  Ships in and around Indian waters may participate.

It may be necessary to consider the introduction of such system in Indonesian waters for effective search and rescue operations.

7.2 Long-term Development Plan

7.2.1 Basic System Plan

7.2.1.1 Maritime Safety and SAR Telecommunicaions System

(1) Establishment of COSPAS/SARSAT LUT

The LUT needs to be established to receive the EPIRB signal sent via the satellite and determine the location of the EPIRB. The EPIRB signal will be received at the LUT in a realtime mode within the coverage of about 2,000 - 2,500 km in radius from the LUT. Taking into account the geographical configurations of Indonesia, it will be necessary to site two LUTs, one in Jakarta, the central-western area of Indonesia and the other in Ambon, the eastern area.

(2) Establishment of A1 Areas = VHF DSC Communications Facilities

Since the propagational characteristics of VHF limit the service areas within line of sight, the plan is made to establish the VHF facilities to cover the Gateway ports, where are high density areas in traffic and marine accidents.

The VHF communications will be carried out in the following frequency bands:

- Distress alerts and safety calls by DSC: 156.525 MHz (Ch 70)
- Search and rescue coordinating communications and on-scene communications: 156.8 MHz (Ch 1 16)

(3) Establishment of A2 Areas = MF DSC/NBDP Communications Facilities

The frequencies in the MF bands are used for medium-range service (approx. a few hundred miles). High speed communication may be done by NBDP MF band on the 2174.5 kHz for search and rescue communications.

(4) Establishment of A3 Area

(i) HF DSC/NBDP Communications Facilities

The HF frequencies given in Table 7-2-1 have been designated in the 4, 6, 8, 12 and 16 MHz bands to provide means for transmitting and receiving distress alerts and safety calls and for passing distress and safety traffic:

Table 7-2-1 Frequencies in HF Band for Distress Alerts and Safety Calls

DSC	Radiotelephony RT	Radioteletype NBDP
4,207.5	4,125	4,177.5
6,312	6,215	6,268
8,414.5	8,291	8,376.5
12,577	12,290	12,520
16,804.5	16,420	16,695

(ii) Establishment of INMARSAT Ship Earth Station (SES)

INMARSAT satellites are in use for long distance communications and Indonesian waters are within the service areas of satellites covering the Pacific and Indian Oceans. INMARSAT SES needs to be installed in Jakarta and each KANWIL respectively.

(5) Establishment of NAVTEX

NAVTEX has the features of automatically receiving messages on board the ships enabling them to receive at any time, of directly printing on paper and of selectively receiving the messages required. The establishment of NAVTEX will no doubt contribute to the prevention of marine accidents through promulgation of the maritime safety information.

The messages to be broadcast by NAVTEX stations are as follows:

- Navigational warnings
- Meteorological warnings
- Search and rescue information
- Weather forecast
- Pilotage information
- Omega information
- Differential Omega information
- MF radiobeacon information
- Aids to navigation information
- Procedures for navigational warnings
- QRU (no information off hand)

7.2.1.2 Establishment of Maritime SAR Information Networks

(1) Establishment of Trunk Line Networks Utilizing PALAPA Transponder

It is expected that the volume of information to be dealt with in the Directorate General of Sea Communication increase in the future due to the promulgation of on-board radio installations, to the development of ports

and harbours, to the introduction respectively of GMDSS and a ships reporting system as a part of Wawasan Nusantara concept and so forth.
For this reason, a study needs to be made to establish a new information system between DGSC and KANWILs for smooth transmission and process of SAR related information.
As a means of implementation of the above, the two alternatives may be considered; implementation of high speed communications by the existing HF and use of the communication networks of PALAPA satellite.

(i) High Speed Communications by HF

This system is to secure the promptness of information processing through speedup and automation improving the existing HF system of low speed at 50 b/s, time division and manual processing.
The implementation of this system is considered useful as an immediate development due to the facts that the necessary costs for construction and operation are to be comparatively low and the volume of SAR message presently being dealt is rather limited.

(ii) Communications System Exclusively Using PALAPA Satellite

This system constitutes the information and communications networks through the use of transponders of PALAPA satellite establishing a central earth station at DGSC and local earth stations at each KANWIL. This system will be connected with the existing telephone exchange and also with the teletype automatic exchange system planned in this report for direct and immediate exchange and processing of SAR information between DGSC and KANWILs by telephone/fax and data/message communications.

Exclusive use of the satellite transponder will be required in this system because of SAR implication, and for this purpose necessary operation costs (in Rupiah budget) for the exclusive use needs to be secured. In such case, an information and communications system to be linked with the DGSC area information and communications networks being established in FTA-193.

PALAPA is presently in use in Indonesia for domestic communications of public telephone and TV broadcasting, leasing for ASEAN nations (Singapore, Malaysia, Thailand and the Philippines) and for military use for Thailand.
The operation and administration for the satellite and earth stations of the PALAPA system are under the responsibility of PERUMTEL.
Fig. 7-2-1 shows the network line.

(2) Establishment of Area Information Networks

(i) The main P-P information networks will be connect with the SAR coastal radio stations within the KANWIL areas in order to link the SAR information with the area information networks. The point-to-point information networks need to be established are as shown below:

KANWIL	P-P Link		
I	Sabang (II)	-	Belawan (I)
II	Tg. Ubang (IV/A)	-	Dumai (I)
III	Tg. Pandang (IV/B)	-	Jakarta (I)
	Palembang (I)	-	Jakarta (I)
	Pointianak (III)	-	Jakarta (I)
IV	Semarang (III)	-	Surabaya (I)
	Benoa (III)	-	Surabaya (I)
V	Banjarmasin (II)	-	Balikpapan (II)
IX	Sorong (II)	-	Jayapura (I)

(ii) Information Links with KKR, SKR, etc.

Presently, the implementation of area information networks is in progress to link, mainly by the TDMA in 2 GHz, KANWIL KPLP units and the receiving stations for that they may exchange information by automatic dial communications. However, the information links are presently not available for the following SAR related organizations.

a) 2 GHz TDMA link with relevant offices

KANWIL	P-P Link		
II	SKR (Dumai)	-	KANWIL II (Dumai)
	SKR (Tg.Pinang)	-	Tg. Ubang TX
	ATC (Tg.Pinang)	-	METEO
	METEO (Tg.Pinang)	-	SKR (Tg. Pinang)
IV	METEO (Surabaya)	-	Surabaya RX
VI	METEO (Ujung Pandang)	-	Ujung Pandang RX
VII	METEO (Bitung)	-	Bitung RX
VIII	METEO (Ambon)	-	SKR (Ambon)
IX	KKR (Biak)	-	Jayapura RX
	SKR (Jayapura)	-	Jayapura RX
	ATC (Sorong)	-	Sorong RX

b) 2 GHz TDMA link with DGSC local units

Information links with the following local units will be made:

KPLP Units
Harbour Master Units
District of Navigation Units
Pilot Office Units
Maritime Services Units

The terminals given above will be linked with the existing networks through the automatic message reception and delivery communications and information transmission by facsimile. Fig. 7-2-2 shows the system configuration of area information networks.

(3) Network Links with New Establishments Proposed

Following the long term development plan for the organizational and rescue system for the maritime safety and SAR, the relevant development plan is made to link the relevant offices and units including DGSC and KANWILs for the overall maritime safety and SAR information and communications system in order to secure the efficient and prompt flow and exchange of the maritime safety and SAR information and messages.

Links will be established among the proposed units and the existing organizations within the maritime safety and SAR information networks in order for the Operation Office and Regional Operation Offices and other organizations to be able to deploy the individual missions to a full extent. The relevant organizations and units will be equipped with the necessary equipment according to the long term plan made in this study.

(4) Improvement of Tg.Uban Radio Station

The existing Tg.Uban station is a simple type installations of transmitter, receiver and operation and so on in one quarter and the watch hours are eight hours since it is a Class IV/A station.

The improvement is planned for the station to separate the transmitting station from the receiving, which will also be improved.

(5) Establishment of Aeronautical Communications

For smooth exchange of the distress information and communications on search and rescue with the SAR aircraft, the air VHF and air HF will be installed at each KANWIL and the KPLP units in main areas and also on board the relevant patrol ships.

(6) Establishment of Marine Radio Direct Dialling System (MRDTS)

The marine ratio direct dialling system will be established for exchange of the information on maritime safety and SAR between the on-shore units and the DGSC ships. The telecommunication equipment of 150 MHz band will be installed at the on-shore establishments and on board the DGSC ships.

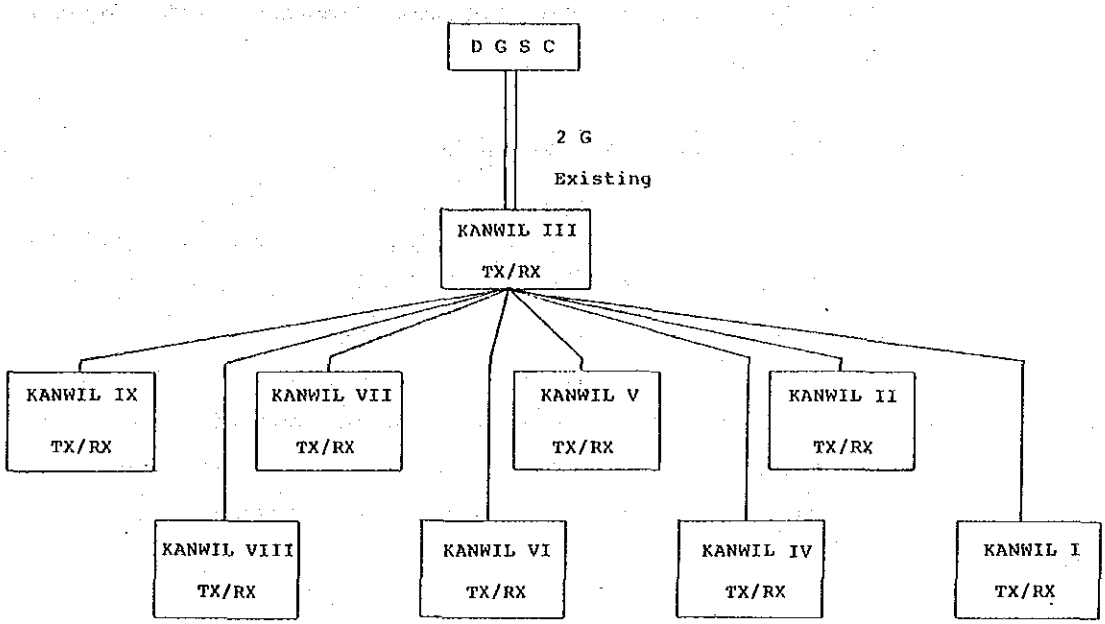


Fig. 7-2-1 Maritime SAR Information Networks

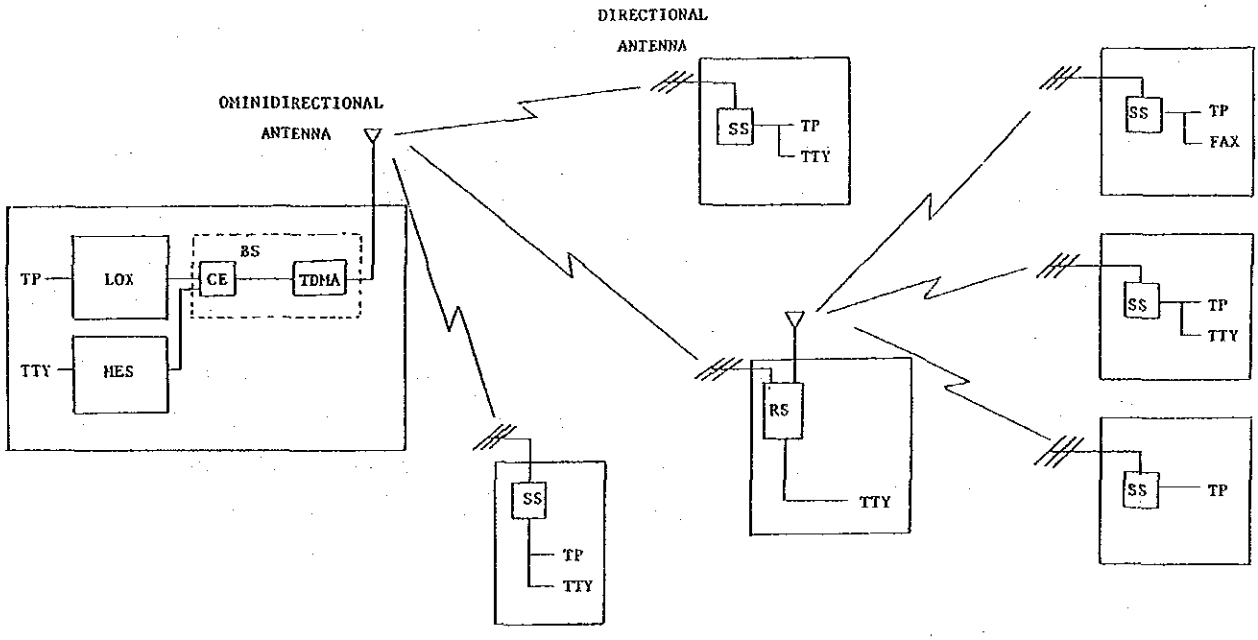


Fig. 7-2-2 System Configuration of Area Information Networks

7.2.1.3 Establishment of Command and Control Communications System including Ship Reporting System

(1) Establishment of Message Exchange System (MES)

The Message Exchange System is to secure the prompt and reliable exchange of teletype messages between DGSC, KANWIL, ADPEL, SAR coastal radio stations, BASARNAS, and METEO using a computer system.

With MES, loss of messages is to be protected even in case of failures of communication link networks and terminal devices since they are to be stored, and the messages are to be transmitted upon recovery of these failures.

All the Messages are to be stored in MES for a few months and to be output, as necessary. They are to be printed or displayed, and the number of messages and words is also to be shown.

Messages to be exchanged between KANWIL's flow through MES at DGSC via the SAR coastal radio station. Fig. 7-2-3 shows the MES networks, and Fig. 7-2-4 describes the systematic diagram of MES.

(2) Management Information System (MIS)

MIS will have an access to the SAR information networks for efficient control and monitoring of the ships and port operations.

(3) Area Communication Terminals

The telephone device will be installed at all the maritime safety and SAR units linked in the area information networks. Facsimiles will be installed at all KANWILs, KPLP units, receiving stations, KKRs and SKRs. TTY will be installed at all the same units as for telephone devices.

(4) Ship Reporting System

The composition of Ships Reporting System is shown in Fig. 7-2-5.

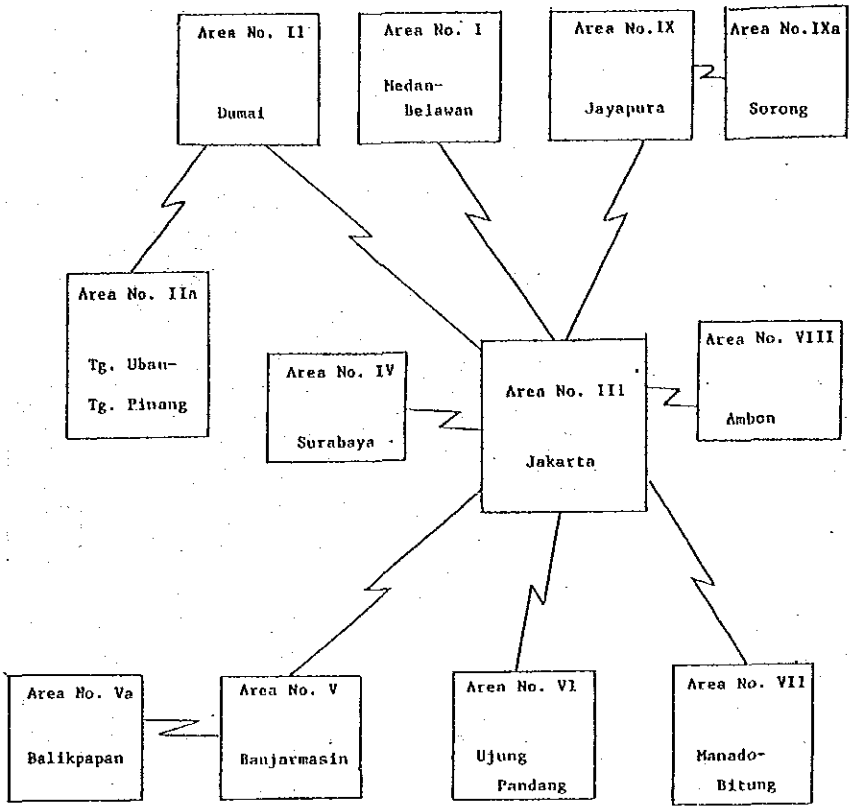


Fig. 7-2-3 Diagram of Message Exchange System Networks

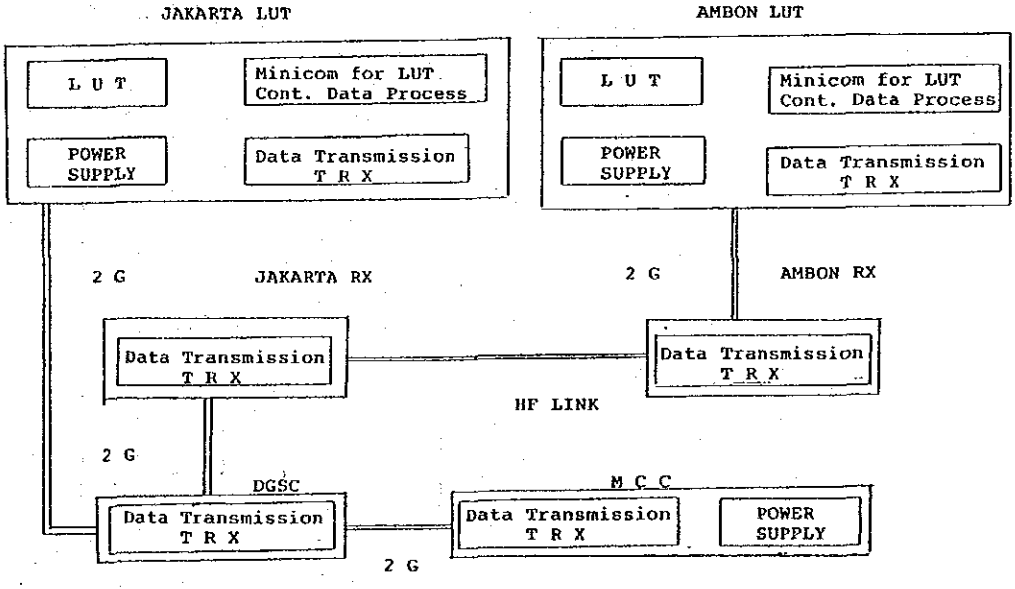


Fig. 7-2-6 System Composition of the LUTs

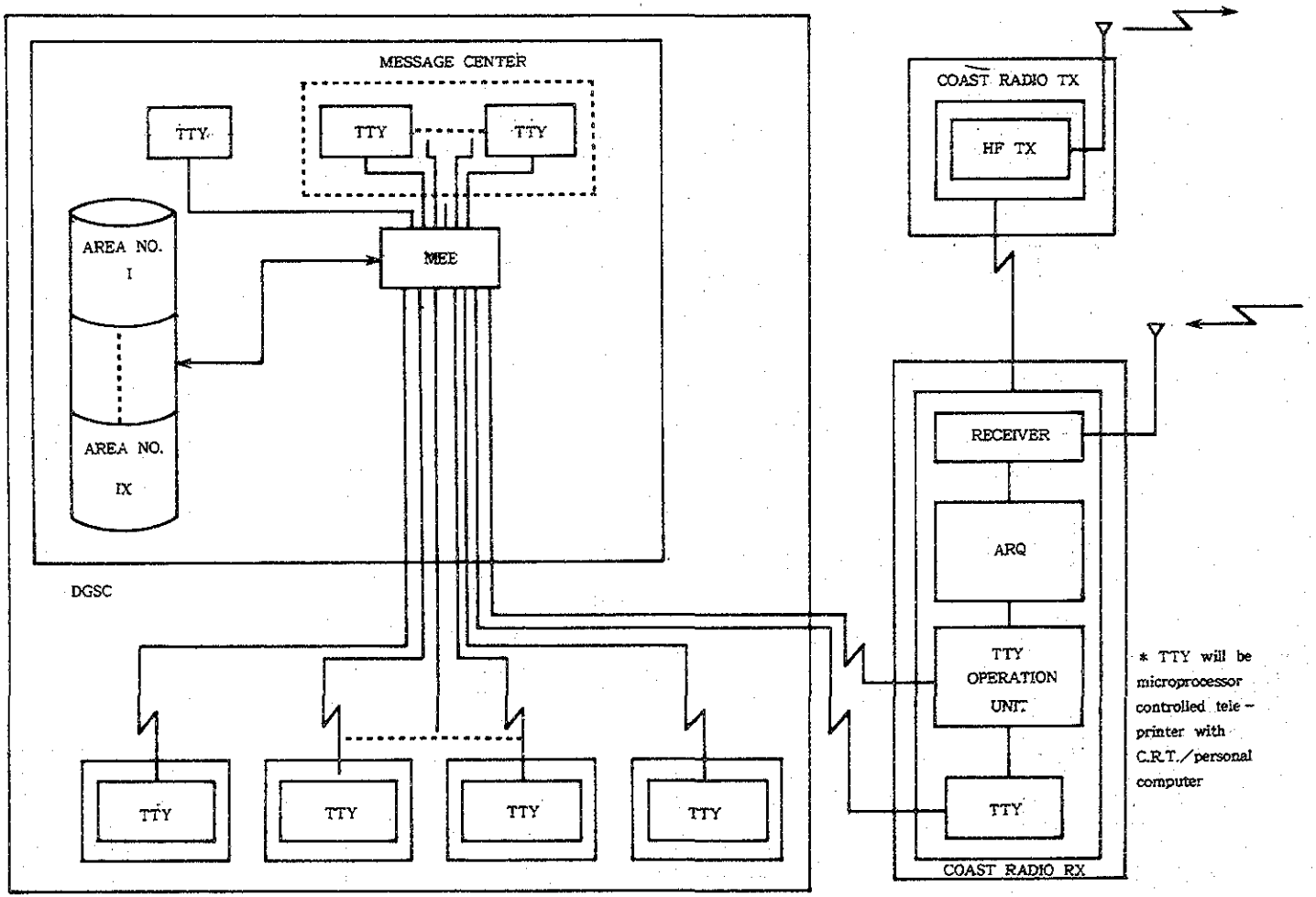


Fig. 7-2-4 Systematic Diagram of Message Exchange System (Area No. III)

Composition of Ships Reporting System

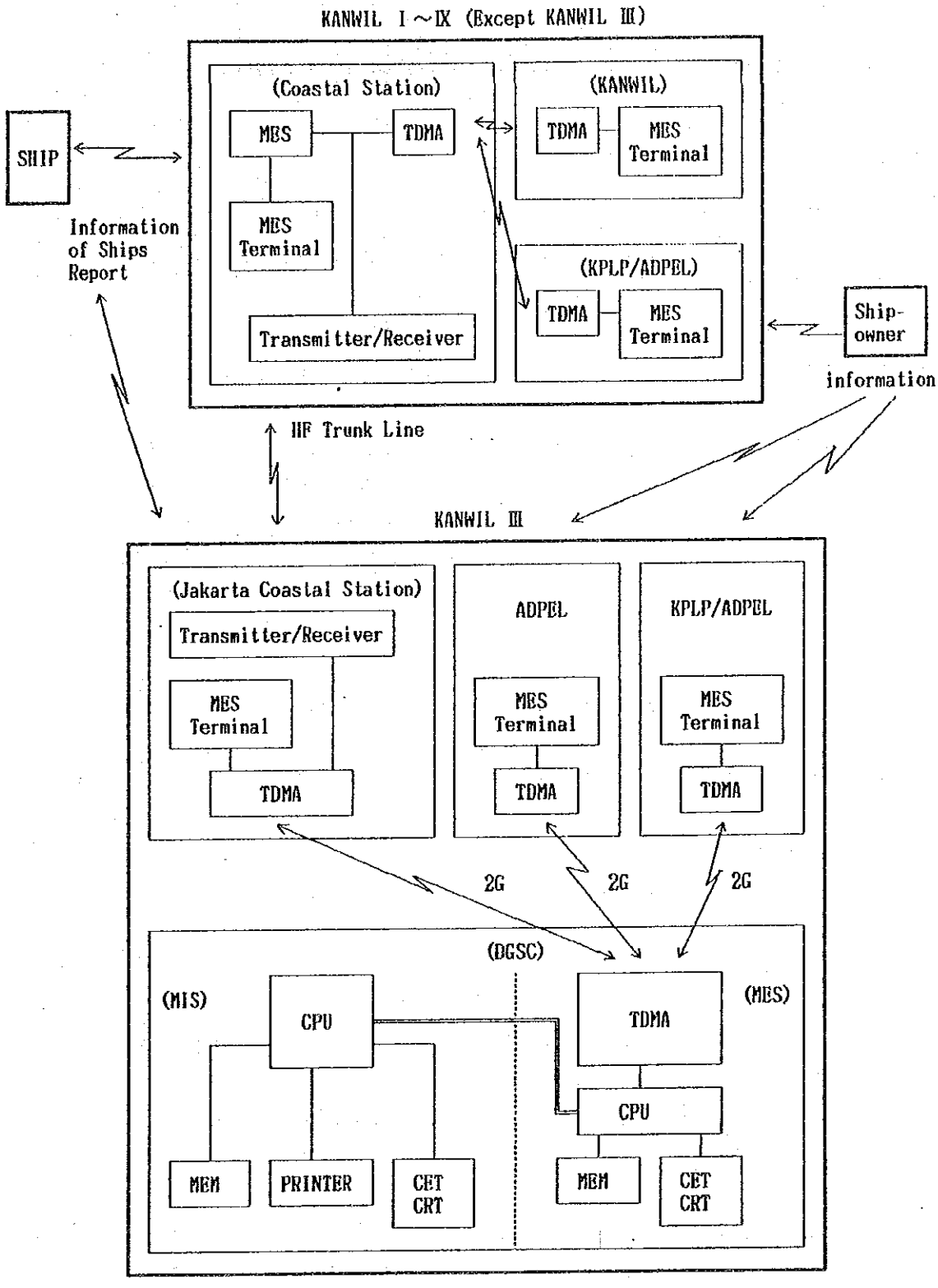


Fig. 7-2-5 Composition of Ships Reporting System

7.2.2 Development Plan

7.2.2.1 Maritime Safety and SAR Telecommunications System

(1) Establishment of LUT

(i) Location Plan

- Two LUTs will be established on each in Jakarta and Ambon areas.

(ii) Facility/Equipment Plan

- The facility/equipment plan for each LUT is as given below:

a)	LUT	2 sets
b)	Minicomputer for LUT control data processing	2 sets
c)	Transmitter/receiver for data transmission	2 sets
d)	Power supply	2 sets
e)	Shelters	2 sets
f)	Antenna system	2 sets

The system composition of the LUTs is shown in Fig. 7-2-6.

(2) Establishment of VHF DSC Communication Facilities

(i) Location Plan (DGSC ships)

- A list of the relevant ships is given in APPENDIX-VII.

(ii) Facility/Equipment

a) On-shore establishments

The facility/equipment consist of:

- VHF transceiver 4 sets
- Antenna system 4 sets
- Console 1 set

b) DGSC ships

- VHF transceiver 60 sets
- Antenna system 60 sets
- Control unit 60 sets

(3) Establishment of MF DSC/NBDP Communications Facilities

(i) Location Plan

a) On-shore establishments

- The SAR coastal radio stations given in Table 7-2-2.

b) DGSC ships

- The list of ships details is given in APPENDIX-VII.

(ii) Facility/Equipment Plan

a) On-shore establishments

a. SAR coastal radio stations - Transmitting stations

- 0.5 kW MF transmitter	18 sets
- Antenna system	18 sets

b. SAR coastal radio stations - Receiving stations

- All wave receiver	18 sets
- Spot receiver	18 sets
- DSC/NBDP console including: ARQ terminal, Remote control local terminal pack, DSC equipment, Signal control unit	18 sets
- Antenna system	18 sets

(4) Establishment of HF DSC/NBDP Communications Facilities

(i) Location Plan

The HF DSC/NBDP will be installed at the SAR coastal radio station in Jakarta.

(ii) Facility/Equipment

The following equipment will be installed:

a) Transmitting station

- 1 kW HF Transmitter 6 sets - Antenna system 6 sets

b) Receiver station

- All wave Receiver 12 sets - Console 1 set

(5) Establishment of INMARSAT SES for SAR Operations Office

(i) Facility/Equipment Plan

- INMARSAT system 10 ea - Antenna system 10 ea

(6) Establishment of NAVTEX

(i) Location Plan

a) On-shore establishments

The SAR coastal radio stations given in Table 7-2-3 will be equipped with NAVTEX. A list of ships details is given in APPENDIX-VII.

(ii) Facility/Equipment Plan

a) On-shore establishments

The following equipment will be installed at each SAR coastal radio station

a. Transmitting station

- NAVTEX transmitter 1 ea/st. - Antenna system 1 ea/st. (F1B 1kW)

b. Receiving station

- NAVTEX console 1 ea/st.

b) DGSC ships

- NAVTEX receiver 1 ea/ship

Table 7-2-2 Location Plan for MF DSC/NBDP

NO.	KANWIL	RADIO STATION	CLASS
1	I	Sabang	II
2		Belawan	I
3	II	Dumai	I
4		TG.Ubang	IV
5	III	Palembang	I
6		Jakarta	I
7		Pontianak	II
8		TG.Pandang	IV/B
9	IV	Surabaya	I
10		Semarang	II
11		Benoa	III
12	V	Banjarmasin	II
13		Balikpapan	II
14	VI	Ujung Pandang	I
15	VII	Bitung	I
16	VIII	Ambon	I
17	IX	Sorong	II
18		Jayapura	I

Table 7-2-3 Location Plan for NAVTEX

KANWIL	RADIO STATION	CLASS
I	Belawan	I
II	Dumai	I
III	Jakarta	I
IV	Surabaya	I
VI	Ujung Pandang	I
VII	Bitung	I
VIII	Ambon	I
IX	Jayapura	I

7.2.2.2 Establishment of Maritime SAR Information Networks

(1) Establishment of Trunk Line Networks Utilizing PALAPA Satellite Transponder

(i) High Speed Communications by HF

The locations are in the areas of DGSC and all the KANWILs except KANWIL III. The equipment will be installed at the relevant SAR coastal radio stations.

a. Jakarta area

- 1 kW HF Transmitter	8 ea	- HF Console	1 set
- Receiver	8 ea	- Antenna Systems	1 set

b. Other areas

- 1 kW HF transmitter	3x8	24 ea
- Receiver	3x8	24 ea
- HF console		8 sets
- Antenna system		8 sets

(ii) Communications System exclusively Using PALAPA Satellite

The locations are in the areas of DGSC and all the KANWILs except KANWILL III.

a) Jakarta Area

- Central Earth Station	1 ea
- Antenna system	1 set

b) Other Areas

- Local Earth Station	1 x 8	8 ea
- Antenna System	1 x 8	8 ea

(2) Establishment of Area Information Networks

(i) Area Information Networks

The point to point information networks will be established installing the equipment at the relevant SAR coastal radio stations. The facility/equipment plan is as follows:

- Transmitter	32 ea	- EGS	16 ea
- Receiver	32 ea	- Antenna system	32 ea
- Console	32 ea		

(ii) 2 GHz TDMA

The area-wise plan for facility/equipment is as follows:

a) Medan - Belawan Area

- DRCS SS	2 ea	- Antenna System	2 sets

b) Dumai Area

- SSB Radio Telephone equipment	2 ea	- Antenna System	2 sets

c) Tg.Uban - Tg.Pinang Area

- DRCS SS	12 ea	- Antenna System	18 sets
- VHF Radio Link Equipment	4 ea		

d) Jakarta Area

- DRCS SS	6 ea	- Antenna System	6 sets

e) Surabaya Area

- DRCS SS	4 ea	- Antenna System	4 sets

f) Ujung Pandang Area

- DRCS SS	2 ea	- Antenna System	2 sets

g) Manado - Bitung Area

- DRCS SS	2 ea	- Antenna System	2 sets

h) Jayapura Area

- DRCS SS	2 ea	- VHF Radio Link Equipment	2 ea
- HF Radio Link Equipment	2 ea	- Antenna System	6 sets

i) Sorong Area

- DRCS SS	2 ea	- Antenna System	2 sets

(3) Network Links with New Establishments Proposed

(i) Establishment of Operation Offices

a) Locations

DGSC

All KANWILs

KPLP in each KANWIL

b) Equipment Plan

Telephone, facsimile, teletypewriter Operation Office and NAVTEX RX Consoles (including Electronic Chart) will be established. The equipment plan for the area information networks is as given in Table 7-2-4.

Table 7-2-4 Equipment Plan for Telephone, Facsimile and Teletypewriter

KANWIL	AREA	LOCATION	TP	FAX	TTY	CONSOLE	NAVTEX RX
I	Medan - Belawan	KANWIL I.OP/O	1	1	1	1	1
		KPLP/ADPEL.OP/O	1	1	1	1	1
II	Dumai	KANWIL II.OP/O	1	1	1	1	1
		KPLP/ADPEL.OP/O	1	1	1	1	1
	TG.Uban	KPLP/ADPEL.OP/O	1	1	1	1	1
III	Jakarta	DGSC OP/O	2	2	2	1	1
		DGSC Planning	1	1	1	1	1
		KANWIL III.OP/O	1	1	1	1	1
		KPLP/ADPEL.OP/O	1	1	1	1	1
IV	Surabaya	KANWIL IV.OP/O	1	1	1	1	1
		KPLP/ADPEL.OP/O	1	1	1	1	1
V	Banjarmasin	KANWIL V.OP/O	1	1	1	1	1
		KPLP/ADPEL.OP/O	1	1	1	1	1
	Balikpapan	KPLP/ADPEL.OP/O	1	1	1	1	1
VI	Ujung Pandang	KANWIL VI.OP/O	1	1	1	1	1
		KPLP/ADPEL.OP/O	1	1	1	1	1
VII	Manado - Bitung	KANWIL VII.OP/O	1	1	1	1	1
		KPLP/ADPEL.OP/O	1	1	1	1	1
VIII	Ambon	KANWIL VIII.OP/O	1	1	1	1	1
		KPLP/ADPEL.OP/O	1	1	1	1	1
IX	Jayapura	KANWIL IX.OP/O	1	1	1	1	1
		KPLP/ADPEL.OP/O	1	1	1	1	1
	Sorong	KPLP/ADPEL.OP/O	1	1	1	1	1
		Total	24	24	24	23	23

OP/O ---- Operation Office

(ii) Establishment of DGSC Air stations

a) Location

KANWIL	Locations
I	Medan
II	Tg.Uban
III	Jakarta

KANWIL	Locations
IV	Surabaya
VI	Ujung Pandang
VIII	Ambon

b) Facility/Equipment Plan

a. Links

Medan Air Base - Belawan Coast Station

Tg.Uban Air Base - Tg.Uban Coast Station

Jakarta Air Base - DGSC

Surabaya Air Base - Surabaya Coast Station

Ujung Pandang Air Base - Ujung Pandang Coast Station

Ambon Air Base - Ambon Coast Station

b. Facility/Equipment Plan

- DRCS SS	6 ea	- Antenna System	6 ea
- Operation Console	6 ea	- Shelter for operation room	6 ea
- 130 MHz Air VHF TRX	6 ea		
- HF Transmitter	6 ea	- Power Supply Hut	6 ea
- Receiver	12 ea	- Terminal Device (TPx6, FAXx7, TTYx6)	6 sets
- NAVTEX Receiver	6 ea		
- UPS	6 ea	- Associated equipment	1 set

(iii) Establishment of special rescue system

a) Location

KANWIL	Locations
II	Tg.Uban
III	Jakarta
IV	Surabaya

KANWIL	Locations
VI	Ujung Pandang
VIII	Ambon

b) Facility/Equipment Plan

a. Links

Tg.Uban Special Rescue Station - Tg.Uban KPLP unit
Jakarta Special Rescue Station - DGSC
Surabaya Special Rescue Station - KANWIL IV
Ujung Pandang Special Rescue Station - KANWIL VI
Ambon Special Rescue Station - KANWIL VIII

b. Facility/Equipment Plan

- DRCS SS	5 ea	- Shelter for EGS	5 ea
- Console	5 ea	- Terminal Device (TPx6, FAXx7, TTYx6)	5 sets
- Antenna System	5 ea		
- Shelter for operation room	5 ea	- Associated equipment	1 set

(iv) Establishment of MCC

a) Location

KANWIL	Locations
III	Jakarta

b) Facility/Equipment Plan

a. Links

MCC - DGSC

b. Facility/Equipment Plan

- DRCS SS	1 ea	- Shelter for UPS	1 ea
- Operation Console	1 ea	- Electronic Chart	1 ea
- UPS	1 ea	- Int'l telex	1 ea
- Antenna system	1 ea	- Terminal device (TPx6, FAXx7, TTYx6)	1 set
- Shelter for operation room	1 ea		

(v) Establishment of DGSC Academy

a) Location

KANWIL	Locations
III	Jakarta

b) Facility/Equipment Plan

a. Links

DGSC Maritime Safety Academy - DGSC

b. Facility/Equipment Plan

- DRCS SS	1 ea	- Terminal device (TPx6, FAXx7, TTYx6)	1 ea
- Antenna System	1 ea		

(4) Improvement of Tg.Uban Radio Station

The facility/equipment plan is as follows:

(i) Coast Radio TX

- MF HF Transmitter	2 ea	- Transmitter Building	1 set
- Operation Console	1 set	- Power Supply Hut	1 set
- UPS system	1 set		
- Antenna System	1 set		

(ii) Coast Radio RX

- All wave Receiver	2 ea	- UPS System	1 set
- Spot Receiver	1 ea	- Antenna System	1 set
- Operation Console	1 ea	- Power Supply Hut	1 set

(5) Establishment of Air VHF and Air HF

(i) Locations

a) On-shore establishments

The location plan for installation of Air VHF system is as given in Table 7-2-5.

b) DGSC ships

A list of ships is given in APPENDIX-VII.

(ii) Facility/Equipment Plan

a) On-shore establishments

- 130 MHz Air VHF TRX	12 ea	- Power Supply	12 ea
- Air HF TX/RX	12 ea	- Antenna System	12 ea
- 130 MHz Air VHF TRX	22 ea	- Power Supply	22 ea
- Control/display	22 ea	- Antenna system	22 sets

b) DGSC ships

130 MHz Air VHF TRX	22 ea	Power Supply	22 ea
Control/display	22 ea	Antenna System	22 ea

(6) Establishment of Marine Radio Direct Telephone System (MRDTS)

(i) Locations

The locations are both at on-shore establishments and on board the DGSC ships.

a) On-shore establishments

The on-shore establishments shown in Table 7-2-6 will be equipped with the marine radio direct dialling system.

b) DGSC ships

The details of the ships are as given in APPENDIX-VII.

(ii) Facility/Equipment Plan

a) On-shore establishments

The following equipment will be installed:

a. MRDTS Base Station Equipment

b. MRDTS Signal Converting Equipment

b) DGSC ships

The following mobile equipment will be installed:

MRDTS Mobile Station Equipment

Table 7-2-5 Location Plan for Air VHF and Air HF

KANWIL	AREA	LOCATION
I	Medan-Belawan	KANWIL I
II	Dumai	KANWIL II
	Tg.Uban	KPLP
III	Jakarta	KANWIL III
IV	Surabaya	KANWIL IV
V	Banjarmasin	KANWIL V
	Balikpapan	KPLP
VI	Ujung Pandang	KANWIL VI
VII	Manado	KANWIL VII
VIII	Ambon	KANWIL VIII
IX	Jayapura	KANWIL IX
	Sorong	KPLP

Table 7-2-6 Location Plan for Marine Radio Direct Dialling System = On-shore Establishments

KANWIL	AREA	LOCATION
I	Medan-Belawan	Coast Radio RX
II	Dumai	Coast Radio RX
	Tg.Uban	Coast Radio RX
III	Jakarta	Coast Radio TX
IV	Surabaya	Jamuang L.H
	Surabaya	Relay Station
V	Banjarmasin	Coast Radio RX
	Balikpapan	Coast Radio RX
VI	Ujung Pandang	Kudingren L.H.
VII	Manado/Bitung	Makawenbeng RS
VIII	Ambon	Coast Radio RX
IX	Jayapura	Coast Radio RX
	Sorong	Coast Radio RX

7.2.2.3 Establishment of Command and Control Communications System including Ship Reporting System

(1) Establishment of Message Exchange System (MES)

(i) Location Plan

The establishment of MES will be planned mostly at the SAR coast radio stations as shown in Table 7-2-7.

Table 7-2-7 Location Plan for MES

KANWIL	AREA	MAIN EQUIPMENT (MES)
I	Medan - Belawan	Coast Radio RX
II	Dumai	Coast Radio RX
	Tg.Uban - Tg.Pinang	Coast Radio RX
III	Jakarta	DGSC
IV	Surabaya	Coast Radio RX
V	Banjarmasin	Coast Radio RX
	Balikpapan	Coast Radio RX
VI	Ujung Pandang	Coast Radio RX
VII	Bitung	Coast Radio RX
VIII	Ambon	Coast Radio RX
IX	Jayapura	Coast Radio RX
	Sorong	Coast Radio RX

(2) Area Communications Terminals

Telephone, facsimile and teletypewriter will be installed at the locations as given in Table 7-2-8.

7.2.2.4 Associated Installations

(1) Electronic chart

(i) Location Plan

The electronic chart will be installed at the locations given in Table 7-2-9.

Table 7-2-8 Installation Plan for Telephone, Facsimile and Teletypewriter

KANWIL	AREA	Location	Devices		
			T P	FAX	TTY
I	Medan-Belawan	KANWIL I	(9)	2	2
		Coast Radio RX	(2)	1	1
		KPLP/ADPEL	(3)	1	1
		ADPEL	(1)	1	1
		HBH/ADPEL	1		1
		NAV/ADPEL	1		1
		SKR	(1)	1	1
II	Dumai	KANWIL II	(8)	2	2
		Coast Radio RX	(2)	1	1
		KPLP/ADPEL	(3)	1	1
		HBH/ADPEL	1		1
		SKR	1	1	1
II-a	TG.Uban -TG.Pinang	Coast Radio RX	(2)	1	1
		KPLP(TG.Uban)	(3)	1	1
		HBH	1		1
		Coast Radio HBH	1	1	1
		KPLP	1	1	1
		KPLP/ADPEL	1	1	1
		HBH/ADPEL NAV/ADPEL	2		1
		METEO	1	1	1
		SKR	1	1	1
		ATC	1	1	1
III	Jakarta	DGSC	(9)	(1)1	5
		KANWIL III	(8)	(1)1	2
		Coast Radio RX	(1)		1
		Coast Radio TX	(2)		
		ADPEL	(3)	1	1
		FLEET KPLP KPLP/ADPEL	(4)	1	1
		KPLP/ADPEL	(2)	(1)	1
		HBH/ADPEL	1		1
		NAV/ADPEL	1		1
		HYDROGRAPH	1	1	1
		ADPEL	1	1	1
		METEO	(1)	(1)	1
		Basarnas	(2)	(1)	1
		KKR	(1)	1	1
IV	Surabaya	KANWIL IV	(7)	2	2
		Coast Radio RX	(2)	1	1
		KPLP/ADPEL	(3)	1	1
		ADPEL	(2)	1	1
		HBH/ADPEL	1		1
		LALA/ADPEL	1		1
		NAV/ADPEL	1		1
		METEO	2	1	1
		KKR	(1)	1	1
V	Banjrmasin	KANWIL V	(7)	2	2
		Coast Radio RX	(2)	1	1
		KPLP/ADPEL	(3)	1	1
		HBH.LALA/ADPEL	(4)		1
		SKR	(1)	1	1

KANWIL	AREA	LOCATION	DEVICES		
			T P	FAX	TTY
V-a	Balikpapan	Coast Radio RX	(2)	1	1
		KPLP/ADPEL	(2)	1	1
		HBH.LALA/ADPEL	(4)		1
		KPLP/ADPEL KA KPLP	(1)	1	1
		NAV/ADPEL	1		1
		PILOT OFFICE	1		1
		SKR	(1)	1	1
VI	Ujung Pandang	KANWIL VI	(8)	2	2
		Coast Radio RX	(2)	1	1
		KPLP/ADPEL	(3)	1	1
		ADPEL	(2)	1	1
		LALA/ADPEL	1		1
		HBH/ADPEL	1		1
		NAV/ADPEL	1		1
		METEO	2	1	1
		KKR	(1)	1	1
VII	MANADO-Bitung	KANWIL VII	(10)	2	1
		Coast Radio RX	(2)	1	1
		KPLP/ADPEL	(3)	1	1
		HBH/ADPEL (Manado)	(1)		1
		KPLP/ADPEL (Manado)	(1)		1
		HBH/ADPEL (Bitung)	(1)		1
		NAV/ADPEL (Bitung)	1		1
		METEO	1	1	1
		SKR	(1)	1	1
VIII	Ambon	KANWIL VIII	(6)	2	1
		Coast Radio RX	(2)	1	1
		KPLP/ADPEL	(2)	1	1
		ADPEL	(2)		1
		NAV/ADPEL	1		1
		METEO	1		1
		SKR	(1)	1	1
IX	Jayapura	KANWIL IX	(7)	2	1
		Coast Radio RX	(2)	1	1
		KPLP/ADPEL	(3)	1	1
		ADPEL	(5)		1
		NAV/ADPEL	1		1
		SKR	1	1	1
IX-a	Sorong	Coast Radio RX	(2)	1	1
		KPLP/ADPEL	(4)	1	1
		NAV/ADPEL	4		1
		HBH/ADPEL	(2)		1
		SKR	(1)	1	1
		ATC	1		1
	TOTAL		(183) 40	(5) 68	103

( ) --- Existing

(ii) Equipment Plan

The electronic chart consists of the following:

- Color CRT Display	1 ea	- Keyboard	1 ea
- Control	1 ea	- Floppy disk	1 ea
- Printer	1 ea		

(2) UPS and EPD

(i) UPS

a) Location

The UPS will be installed at the locations as given in Table 7-2-10.

b) Facility/Equipment Plan

The UPS consists of the following:

- Diesel Engine Generator (D/G)	1 ea	- Switch Module	1 ea
		- Batteries	1 ea
- Constant Voltage constant Frequency (CVCF) Module	1 ea	- Rectifier/Charger	1 ea
		- AC/DC Converter	1 ea

(ii) EPD

a) Locations

The EPD will be installed the locations given in Table 7-2-11.

b) Facility/Equipment Plan

a. Temperature and moisture control device

- Air calculation	1 ea	- Moisture control	1 ea
- Temperature control	1 ea		

b. High quality forced air ventilation device

- Weather proof guard	1 ea	- Aluminum wool filter	1 ea

Table 7-2-9

Location Plan for Electronic Chart

KANWIL	Area	Location
I	Medan / Belawan	KANWIL I
II	Dumai	KANWIL II
III	Jakarta	DGSC KANWIL III
IV	Surabaya	KANWIL IV
V	Banjarmasin	KANWIL V
VI	Ujung Pandang	KANWIL VI
VII	Manado / Bitung	KANWIL VII
VIII	Ambon	KANWIL VIII
IX	Jayapura	KANWIL IX

Table 7-2-10

Location Plan for UPS

KANWIL	AREA	LOCATION
I	Medan - Belawan	Coast Radio RX Coast Radio TX KANWIL I
II	Dumai	Coast Radio RX Coast Radio TX KANWIL II
III	Jakarta	DGSC Coast Radio RX Coast Radio TX
IV	Surabaya	Coast Radio RX Coast Radio TX KANWIL IV
V	Banjarmasin	Coast Radio RX Coast Radio TX KANWIL V
	Balikpapan	Coast Radio RX Coast Radio TX
VI	Ujung Pandang	Coast Radio RX Coast Radio TX KANWIL VI
VII	Manado - Bitung	Coast Radio RX Coast Radio TX KANWIL VII
VIII	Ambon	Coast Radio RX Coast Radio TX KANWIL VIII
IX	Jayapura	Coast Radio RX Coast Radio TX KANWIL IX
	Sorong	Coast Radio RX Coast Radio TX

Table 7-2-11

Location Plan for EPD

KANWIL	AREA	LOCATION
I	Medan - Belawan	Coast Radio RX Coast Radio TX KANWIL I, KPLP/ADPEL
II	Dumai	Coast Radio RX Coast Radio TX KANWIL II, KPLP/ADPEL
	TG. Uban	Coast Radio RX Coast Radio TX ADPEL
III	Jakarta	Coast Radio RX Coast Radio TX DGSC,KANWIL III,KPLP/ADPEL
IV	Surabaya	Coast Radio RX Coast Radio TX KANWIL IV,KPLP/ADPEL
V	Banjarmasin	Coast Radio RX Coast Radio TX KANWIL V, KPLP/ADPEL
	Balikpapan	Coast Radio RX Coast Radio TX KPLP/ADPEL
VI	Ujung Pandang	Coast Radio RX Coast RadioTX KANWIL VI, KPLP/ADPEL
VII	Manado - Bitung	Coast Radio RX Coast Radio TX KANWIL VII, KPLP/ADPEL
VIII	Ambon	Coast Radio RX Coast Radio TX KANWIL VIII, KPLP/ADPEL
IX	Jayapura	Coast Radio RX Coast Radio TX KANWIL IX, KPLP/ADPEL
	SORONG	Coast Radio RX Coast Radio TX KPLP/ADPEL

8 Harbour Traffic Control System

Section 8 Harbour Traffic Control System

8.1 Present Situation

8.1.1 Condition of the Major Ports

(1) Belawan

(i) Port Geography

The port of Belawan is an estuary harbour and the biggest port in Sumatera acting as one of the Gate Ports in Indonesia. The position is 3°56'N 98°47'E.

(ii) Berth

a) 001-003

length	300 m	(1,000 DWT)
depth	5 m	

b) 006-008

length	217 m	
depth	5 m	(1,000 DWT)

c) 101-104

length	301 m	
depth	5.7 m	(2,000 DWT)

d) Ocean Kade

length	1188 m	
depth	9.1 m	(1,500 DWT)

e) Unit VI-VII

length	50 m	
depth	5.7 m	(2,000 DWT)

f) ex Adiguna

length	50 m	
depth	5 m	(1,000 DWT)

g) 201-203

length	625 m	
depth	7 m	(5,000 DWT)

h) Peti Kemas

length	850 m	
depth	12 m	(40,000 DWT)

(2) Palembang

(i) Port Geography

The Port of Palembang is a river port located about 54 miles in the upper reaches of Musi River. Palembang has been developed together with oil to be the south entrance to Sumatera. The position is 2° 59's, 104° 46'E.

(ii)

a) A-1

length	476 m	
depth	7 m	LWS (5,000 DWT)

b) Container

length	180 m	
depth	9 m	LWS (15,000 DWT)

c) PPL 3 ilir

length	80 m	
depth	2 m	LWS

d) PPL Sei Lais

length	185 m	
depth	2 m	LWS

e) Bresting Dalpin

length	7.8 m
depth	9 m LWS (15,000 DWT)

f) Kapal Lohal

length	20 m
depth	3.5 m LWS (500 DWT)

(3) Jakarta (Tg.Priok)

(i) Port Geography

The port of Tg.Priok is the largest in Indonesia having been developed as the commercial port, behind which the national metropolis of Jakarta. The position is 6° 6'E, 106° 53'E.

(ii) Berth

a) Nusantara

length	663 m	
depth	5-6 m	(1,000 DWT)

b) Pelabuhan I

length	2677 m	
depth	7-10 m	(5,000 DWT)

c) Pelabuhan II

length	2040 m	
depth	7-10 m	(5,000 DWT)

d) Pelabuhan III

length	2236 m	
depth	8-12 m	(8,000 DWT)

e) Pelabuhan minyakdi muara Sunter

length	100 m	
depth	9-10 m	(15,000 DWT)

(4) Surabaya (Tg.Perak)

(i) Port Geography

Surabaya is located in eastern Jawa facing the surabaya Channel with Mandrura Is. on the other side. Surabaya is the second biggest city in Indonesia next to Jakarta and has been developed as the eastern entrance to Jawa as well as an important base for the transportation of goods directing to the eastern areas of Indonesia, and accordingly the port facilities and the loading and unloading of cargoes dealt in Tg.Perak port rank at the second following Tg.Priok. The position is 7°12'S, 112°44'E.

(ii) Berth

a) Jamrud Utar

length	950 m
depth	9.5 m LWS (15,000 DWT)

b) Jamrud Selatan

length	800 m
depth	9.5 m LWS (15,000 DWT)

c) Jamrud Barat

length	160 m
depth	9.5 m LWS (15,000 DWT)

d) Berlian Barat

length	735m
depth	9.5 m LWS (15,000 DWT)

e) Berlian Timur

length	780 m
depth	9.5 m LWS (15,000 DWT)

f) Berlian Utara

length	140 m
depth	9.5 m LWS (15,000 DWT)

(5) Banjarmasin

(i) Port Geography

The Port of BanJarmasin is a river port located about 20 miles in the upper reaches of Berito River, south coast of east Kalimantan. Banjarmasin, being the capital city of the province of South Kalimantan is the oldest trade port in Kalimantan. The position is 3°20'S, 114°34'E.

(ii) Berth

a) Martapura I, II

length	248 m 100 m	
depth	4 m	(700 DWT)

b) Trisakti

length	150 m	
depth	8 m	(8,000 DWT)

(6) Ujung Pandang

(i) Port geography

The Port of Ujung Pandang is the largest port in Sulawesi and one of the Gateway Ports in Indonesia as a distribution and accumulation point of cargoes. The position is 5°8'S, 119°24'E.

(ii) Berth

a) Pangkalan Sukarno

length	1350 m	
depth	9 m LWS	(15,000 DWT)

b) Pangkalan Hatta

length	550 m	
depth	8.5 m	(10,000 DWT)

c) PKL Perahu Paotere

length	50 m
depth	4 m LWS (700 DWT)

8.1.2 Pilotage System

(1) Number of Pilots and Tug Boats

(i) Belawan

Sea pilot	:	6
Harbour pilot	:	8
2400 HP tug (twin screw)	:	1
1700 HP Tug (twin screw)	:	1
3500 HP Tug (twin screw)	:	1-private co.
1900 HP Tug (twin screw)	:	1-private co.

(ii) Palembang

River pilot	:	22
Harbour pilot	:	9
1800 HP Tug	:	2-private
1700 HP Tug	:	1
1160 HP Tug	:	1

(iii) Jakarta (Tg.Priok)

Harbour pilot	:	14
1700 HP Tug	:	4
1200 HP Tug	:	4
1060 HP Tug	:	5

(iv) Surabaya (Tg.Perak)

Sea pilot	:	26
Harbour pilot	:	14
1740 HP Tug (twin screw)	:	2
1500 HP Tug (jet peller)	:	1
1450 HP Tug (twin screw)	:	2
1200 HP Tug (twin screw)	:	2-private co.
800 HP Tug (single screw)	:	1

(v) Banjarmasin

River pilot	:	12
Harbour pilot	:	2
800 HP Tug (single screw)	:	1

(vi) Ujung Pandang

Harbour pilot	:	5
1500 HP Tug (twin screw)	:	1
1200 HP Tug(single screw)	:	1
800 HP Tug(single screw)	:	1

8.1.3 Ships Call to the Major Ports

(1) Belawan

(Unit: No. of ships)

Year / Line Category	1980	1981	1982	1983	1984
Ocean going	593	488	547	591	389
Inter island	1,569	1,606	1,506	1,303	1,058
Special	413	567	652	755	1,014
Local	267	263	282	312	359
Total	2,842	2,924	2,987	2,961	2,820

(2) Palembang

(Unit: No. of ships)

Year / Line Category	1984	1985	1986	1987 (sep)
Ocean going	429	412	292	459
Inter island	2,427	2,449	2,028	1,763
Local	2,825	2,585	2,337	1,872
Sailing	865	736	588	380
Total	6,556	6,182	5,245	4,474

(3) Jakarta (Tg.Priok)

(Unit: No. of ships)

Year / Line Category	1982	1983	1984	1985	1986
Ocean going	2,251	2,060	1,892	2,310	2,843
Inter Island	3,650	3,153	3,056	4,082	4,609
Tanker	442	432	456	475	410
Total	6,343	4,781	5,408	6,867	7,862

(4) Surabaya (Tg.Perak)

(Unit: No. of ships)

Year / Line Category	1982	1983	1984	1985	1986
Ocean going	1,048	1,095	990	901	1,008
Inter Island	2,433	2,374	1,863	2,260	2,434
Special	243	237	615	598	656
Local	1,834	1,776	2,118	1,872	2,161
Sailing	5,549	5,482	3,555	3,437	2,910
Total	10,097	9,532	9,141	9,068	9,169

(5) Banjarmasin

(Unit: No. of ships)

Year / Line Category	1984	1985	1986
Ocean going	152	187	176
Special	73	76	98
Interisland	291	288	265
Special Interisland	430	347	624
Local	1,068	1,028	1,024
Sailing	2,268	1,592	2,174
Total	4,282	3,518	4,361

(6) Ujung Pandang

(Unit: No. of ships)

Year / Line Category	1982	1983	1984	1985	1986
Ocean going	180	234	205	226	241
Inter Island	949	915	915	942	1,142
Special	355	348	272	239	366
Local	411	382	257	253	307
Sailing	1,443	1,454	1,253	952	1,408
Total	3,338	3,333	2,902	2,612	3,464

8.1.4 Marine Accidents in Major Ports

(Unit: Number of ships)

Category of ship / Port	Cargo	Tanler	Passenger	Tug boart	Barge	Fishing	Pleasure	Motor	Motorized sailing	Sailing	Others	Total
Belawan	6	2					1	7			2	18
Palembnag	3	1		3		1		3			1	12
Tg. Priok	1	4						1	1			7
Surabaya	13	3			2			7	8		1	32
Banjarmasin	3							1	4		2	10
Ujang Pandang	10		2	1				8	1		2	24
Total	36	10	2	4				27	14		8	103

Further details are given in Section 4, 4.2.2, (2).

8.1.5 Traffic Control System in Other Countries

(1) Kinds of System

(i) Information Service

- Dissemination of traffic information by documents, broadcasting, VHF radio, etc.
- Exchange of information with vessels on maritime traffic situations and providing advice thereon.
- Acceptance of reports on entry into and leaving out of control areas.
- Traffic arrangement in case of emergency

(ii) Traffic Separation Scheme

- Designation of traffic route and flow direction.

(iii) Pilot Dependent Management System

Control of traffic through pilot stations and pilots on board

(iv) Vessel Movement Reporting System

Reporting system at designated positions on ship name, category of ship, length of ship, estimated time of arrival, etc.

(v) Signal Control

Instruction to ships by signal on entry, departure, etc.

(vi) Vessel Movement Reporting System Requiring Permission

Giving approval to ship master wishing to proceed after investigating traffic conflicts and safety traffic conflict and safety.

The main features of vessel traffic management system are as stated below:

a) Traffic Separation Scheme

This system is applied to the fairways which have sufficient width, and is extremely useful for traffic safety. However, legistratory measures need to be taken in this case such as obligatory navigation in specified routes, observance of navigation method in the route and so on.

b) Pilot dependent management system

This system is useful in case where safety of navigation may not be secured without pilots on board, who are familiar with local geographical conditions, such as in narrow channels, approaching the pier with a tide moving nearby, entry into unfamiliar ports, etc. In this case, however, a pilotage system needs to be established either compulsory or non-compulsorily.

c) Vessel movement reporting system

This system is useful for control of entry and departure of large ships or dangerous cargo vessels in specific waters. In this case, reporting on ships position should be made obligatory for specific types of ships

d) Signal control

This system is useful for control of such a case as one way traffic in narrow and congested channels to manage the traffic flow.

e) Vessel movement reporting system requiring permission

This system is useful for control of a certain type of ship (VLCC, dangerous cargo vessel) entering into or departing from a specified area.

Such ships should make request for approval so that other traffic may be restricted for safety navigation.

(2) Traffic Control System in Other Countries

There were over 300 areas in the world where traffic control systems were in operation in 1984, and 130 out of the have been surveyed and the means of traffic control management currently in implementation is as given in Table 8-1-1.

Table 8-1-1 Traffic Control System in Other Countries

Means / Service	VHF (A)	Radar (B)	Traffic Data Process (C)	Radar & Traffic Data Process (D)	Image Process (E)	Total (F)
Information Advice	2	6	0	0	2	10
Traffic Separation	0	0	0	1	1	2
Pilot	3	20	0	0	3	26
Move Reporting (VMR)	16	24	1	2	9	52
Signal Control	15	5	0	0	2	22
VMR Requiring Permission	6	6	2	0	4	18
Total	42	61	3	3	21	130

Note: A: Communications by VHF radio, etc.
B: Radar surveillance
C: Traffic data processing by computer
D: Combination of radar and traffic data processing
E: Radar image processing

The number of VHF radio station and the number of radar stations by length of channels are respectively shown in Tables 8-1-2 and 8-1-3.

Table 8-1-2 Number of VHF Radio Stations and Length of Channels

No. of VHF st. \ Length of Channel km	- 10	- 30	- 100	- 300	- 1000	1000 -	Total
0	13	3				2	18
1	17	26	16	5			64
2	3	2	5	5			15
3		3	6	2	3		14
4 - 5			5	2	2		9
6 - 8		1	1	1	1		4
9 -		1	1	1	3		6

Table 8-1-3 Number of Radar Stations and Length of Channels

No. of VHF st. \ Length of Channel km	- 10	- 30	- 100	- 300	- 1000	1000 -	Total
0	16	16	5	3	5	2	47
1	9	7	3	3	1		23
2	7	7	14	7			35
3	1	4	2	1			8
4 - 5		1	6		2		9
6 - 8			2	1	1		4
9 -			2	1			4

8.1.6 International Tendencies

The Guidelines for Vessels Traffic Services, as given below, was adopted in 1985 by IMO to improve safety and efficiency of traffic and protection of the environment within a port or waterway:

(1) There guidelines describe operational procedures and planning for vessel traffic services (VTS). The guidelines do not address liability or responsibility - which should be considered by the authority establishing a VTS - nor do they create new rights to enact legislation which impose requirements on shipping.

(2) VTS authorities are urged to ensure that vessel traffic services within territorial waters are operated in accordance with national law and do not prejudice the right of innocent passage through such waters and to ensure that vessels outside territorial waters are able to use, on a voluntary basis, the service provided.

(3) No provision of these guidelines shall be construed as prejudicing obligations or rights of vessels provided for in other international instruments.

(4) VTS authorities or those planning VTS are recommended to follow these guidelines, as appropriate to their needs, in the interests of international harmonization and improving maritime safety.

(5) These guidelines describe the possible functions of VTS and provide guidance for designing and operating VTS once it has been decided that such a system, whether simple or highly sophisticated, is necessary. They further aim at international harmonization and address the procedures used by VTS taking into account current practice. They are based on relevant recommendations and resolutions recommended by the Organization, in particular Assembly resolution A.531 (13) on "General Principles on Ship Reporting Systems".

These guidelines contains the following chapters and sections:

- Vessel traffic services
- VTS authority
- Elements of a VTS
- Functions of a VTS
- Procedures
- Personnel
- VTS publication for users
- Planning a VTS

8.2 Analysis

8.2.1 Method

(1) Priority Index

The authorities responsible for securing the safety in ports equally wish to introduce an advanced traffic control system using radar and computer. However, in view of the costly investment and maintenance burden to be incurred, general practice has been a gradual development for priority ports. The following should be considered for the priority execution:

(i) Frequency of accidents occurrence during a certain period.

(ii) Local socioeconomy and impact over the industrial activities.
- Distribution of population
- Distribution of industrial activities
- Degree in scale of impact due to derive from accidents

Collisions and strandings, among other accidents, may be decreased in number through establishment of a traffic control systems, and their impact on the local society is considered high. Therefore, in this instance the occurrence frequency of those two kinds of accidents is to be taken into account.

The scale of impact due to derive from accidents may be considered the same for any ports. The distribution of population and industrial activities will be represented by the number of ships call, which is to be described later in a standardized form.

In this way, the priority index is given (refer to Final Report, Table 8.2.1).

(2) Standardization in Number of Ships

The standardization in number of ships is made such that various sizes of ships may be converted into a standardized size since a variety of size of ships are to call and to be involved with accidents, and the converted size of a ship is 1,000 G/T.
The conversion ratio is this, the number of accident occurrences is at a ratio of the length of ship, and the ships all is at a ratio of the gross tonnage since the ships call attributed to the volume of cargoes. The reason of applying this conversion is that accident probability is in proportion to the power 1.3 of the length of ships.

(3) Relationship between Collisions and Environmental Conditions

The occurrence frequency of collisions increases under the following conditions:

(i) Poor visibility
(ii) Dense traffic
(iii) Navigation in the restricted channels

As shown in Fig. 8-2-1, a risk of collisions under the poor visibility of 0.2 km increases about 100 times that under the normal conditions.

The relationship between a risk of collisions and weather/wave/tide is shown in Table 8-2-1, although the data was analyzed when radars had not been installed.

However, it is considered that the above-mentioned relationship may be responsably applied to the current situations. The figures given in the Table clearly show how badly fog causes the danger of collisions as compared with rain and snow.

The frequency of accident occurrences increases generally is in square proportion to the traffic density, and this will be universally applied including Indonesian waters.

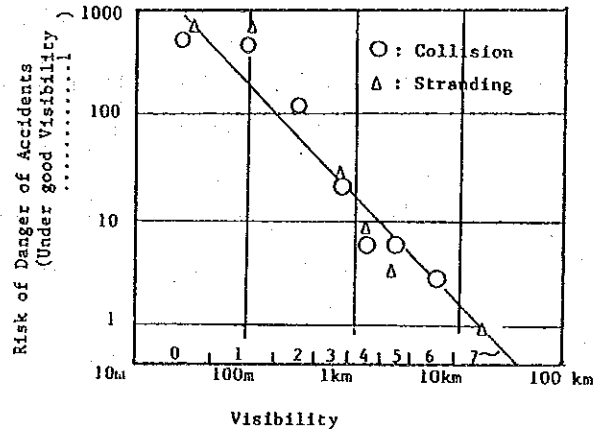


Fig. 8-2-1 Relationship among Risk of Collisions, Risk of Strandings and Visibility

Table 8-2-1 Weather/Tide and Risk Ratio of Strandings

Day				Night	Radar
Wind scale 5 or less neap tide		Spring Tide Ts	Storm St	N	
b.c (Clear)	1.0				
R (Rain)	1.3				
S (Snow)	4.5	1.2	7.3	2.7	0.5
F (Fog)	36.8				

8.2.2 Analysis of Each Port

(1) Comparison of Priority Index

The ships call is estimated at the annual increase rates of 3.65% for motor ships (weighted average of ratio of number of ocean-going and domestic shipping) and 3.5% for motorized sailing ships based on the number of ships call in 1984.
The convertion into 1,000 G/T at G/T ratio means that the total G/T is divided by 1,000 G/T.
Forecast is made based on the estimation that collisions are in square proportion to traffic density and strandings are in proportion to the power 0.3 to traffic density.
The conversion into 1,000 G/T is made for the ships involved in accidents occurred from 1982 to 1986, and an increase in accidents is estimated.

(2) Analysis of Collisions and Environmental Conditions

The environmental factors given below are normalized at "1" for a standard type of port, and those of Nagoya port in Japan are applied to this study.

(i) Traffic density
(ii) Channel size
(iii) Composition of ships flag
(iv) External affect by strong wind and current
(v) Impact by visibility
(vi) Impact by restriction in channel

The mobilized figures in reference to Nagoya data assuming it at "1" are termed as Degree of Collision Risk.

Table 8-2-2 Degree of Collision Risk in Major Prts in 2005

	Average No. of Ships Call		Area Size			Factors				
	Actual (A)	Conv'ted to 1000GT (B)	Area (km^2) (C)	Length (km) (D)	Width (km) (E)	Comparative Density (B/C) (F)	Cruise Distance (D) (G)	$E^{-\frac{1}{2}}$ (H)	G H (I)	F I (J)
Belawan	16.4	22.1	2.9	11.1	0.26	2.07	1.11	1.84	2.04	4.22
Palembang	37.9	34.7	42.0	100.0	0.42	0.02	10.00	1.44	14.40	0.35
Tg. Priok	31.4	32.0	4.0	2.0	0.50	2.28	0.20	1.32	0.26	0.60
Surabaya	52.5	42.2	3.9	14.8	0.26	3.63	1.48	1.84	2.72	9.87
Banjarmasin	24.5	16.8	14.1	42.6	0.33	0.05	4.26	1.63	6.90	0.35
Ujung Pandang	16.6	12.9	9.2	3.41	0.56	0.07	3.41	1.26	4.30	0.30
Nagoya (1983)	132	188	35.2	10.0	0.88	1.00	1.00	1.00	1.00	1.00
Tokyo (1983)	173	135	20.3	3.6	1.42	1.60	1.36	0.79	1.07	1.72
Niigata	38	37	2.4	2.8	0.43	8.90	0.28	1.43	0.40	3.56

The channel width is termed in principle for the channels having 5 meter deep or over. In case of Surabaya, the narrow areas at north entrance of Western channel are taken up for the control areas extending about 8 miles, inside which the channel width is fairly wide and the areas are not for the control. The average number of ships all per day is estimated to increase at the same increase rate as stated in Table 4.3.2 (refer to Final Report). The conversion into 1,000 G/T is made as the product of conversion coefficient of average ships and the total number of ships.

As seen in Table 8-2-2, the comparative density is high at Surabaya, Tg.Priok and Belawan, and the channel scale factors are high in the order of Palembang, Banjarmasin and Ujung Pandang.

8.3 Long-term Development Plan

8.3.1 Harbour Traffic Control System for the Three Ports

(1) Surabaya

(i) Issues on Maritime Safety and the Countermeasures

a) West channel, long and narrow, is the only channel available for main traffic.

b) Anchorages near entrances of West Channel and Tg.Perak are congested due to waiting for pilots.

c) Mouth of and inside Tg.Perak port are narrow

As regards a) and c), above it will be necessary to plan for avoiding face-to-face navigation of over a certain size of ships in the West Channel. Regarding b) above, it will be necessary to control the anchorage by radar and VHF radio.

(ii) Facility/Equipment Plan

a) Maritime traffic control center

a.	Operation console	3
b.	Control console	2
c.	Radar station system	1
d.	Radar image processor	1
e.	Radar image composer	1
f.	Radar image link system	1
g.	Information management system	1
h.	Signal station system	1
i.	VHF and radio link	1
j.	Associated equipment	1

b) Radar station

a.	Radar station system	2
b.	Radar image link system	2
c.	Associated equipment	2

c) Signal station

a.	Signal station system	2
b.	Associated equipment	2

(iii) Main Services

a) Information service

a. Communication

Communication will be made by VHF radio, Perumtel telephone, pilot radio, etc. with ships, ships agents, pilot stations and so on. A reporting line will be established near the entrance to West Channel for over a certain size ships to report on their name and so on.

b) Contents of services

a. Status of signal control and forecast
b. Traffic status in the area
c. Dredging works situation
d. Water depth
e. Anchorage situations
f. Warning for collisions, strandings, etc.

c) Signal control

a. Control method

Report will be made on the estimated time of approval by over a certain size of ships by noon, one day before the estimated time of entry into the control areas so as to establish a navigation plan avoiding face-to-face navigation in the specified areas, and the signal control will be carried out accordingly.

b. Contents of control

The traffic control will be carried out by signals for over a certain size of ships in the West Channel and Tg.Perak port for avoidance of face-to-face navigation.

d) Organization

This organization should be directly under the Port Administrator.

It is considered that the proper, basic and minimum manpower reads as follows:

Head	1 person
Deputy Head	1 person
Operaton Officers	12 persons
(Operation officer	3 persons x 3 shift = 9 persons)
(Traffic control planner	1 person x 3 shift = 3 persons)
Spare Staff	3 persons
Maintenance and Repair Staff	4 persons
Total	21 persons

e) Ships for control

It is considered most appropriate and effective to control the same size of the ships currently made compulsory for pilotage in Surabaya, i.e. 88 GRT and upwards.
The following describes a method of determining the size of ships to be placed under control.

a. Criteria of determining the size of ships for control
- Rank of ships for control (ton or gross ton)
  Z ton: Maximum tonnage of a ship normally 80 through a specified rate.
  Y ton: Minimum tonnage of a ship which may be difficult for face-to-face navigation in a specified route.
  X ton: Minimum tonnage of a ship which may be difficult for face-to-face navigation with Z-ton ship in a specified route.
  (Z Y X)

- Determination of Y ton
  $S = L + 2 (1.8B + 1.7B) = L + 7B$
  where,
  L: Length of a Y-ton ship
  B: Width of a Y-ton ship
  side clearance = 1.8B
  ship's lane = 1.7B
  ship's clearance = L

S: Width of channel

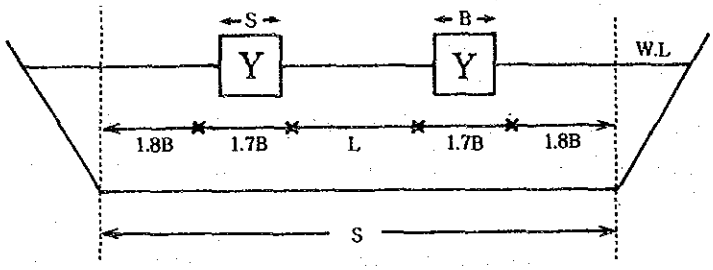
Generally, 7B is nearly equal to L

$S \approx 2L$

Accordingly,

$L \approx S/2$

That is to say, Y-ton ship is given as a ship having the length of approx. half the width of channel.



- Determination of X-ton

$S = L' + (1.8B' + 1.7B') + (1.8b + 1.7b)$

$= L' + 3.5B' + 3.5b$

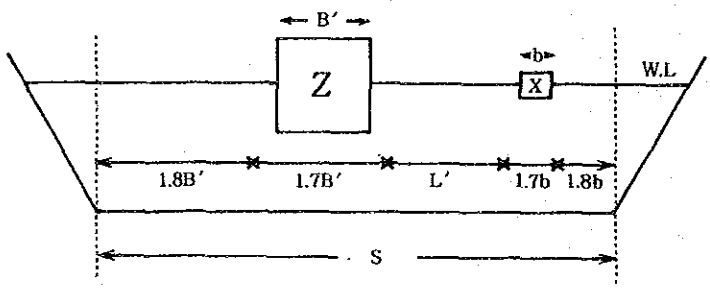
Generally, $L' = 7B'$, $1 = 7b$

Accordingly,

$S = 1.5L' + 0.51$

Therefore,

$1 = 2S - 3L'$



b. Criteria for size of ship to be placed under control in Surabaya

When S = 100 m and 1 = 28 m are applied,

L = S/2 = 100/2 = 50 m

where,

S: Narrowest width of channel

1: Length of a ship assumed that the minimum tonnage of compulsory pilotage (88GRT) is X ton

Since 50 m in length of a ship is equivalent to 500 GRT,

Y = 500 GRT

Also, 1 = 2S - 3L'

Accordingly,

L' = (2S - 1)/3 = (2 x 100 - 28)/3 = 57 m

Since 57 m in length of a ship is equivalent to 1,000 GRT,

Z = 1,000 GRT

(2) Belawan

(i) Issue on Maritime Safety and the Countermeasures

a) Belawan channel is narrow, shallow and long.
b) Anchorages near entrances of Belawan Channel and the port are congested due to waiting for pilots
c) Mouth of and inside the port are narrow.

As regards a) and c) above, it will be necessary to plan for avoiding face-to-face navigation of over a certain size of ships in Belawan channel. Regarding b) above, it will be necessary to control the anchorage by radar and VHF radio.

(ii) Facility/Equipment Plan

a) Maritime traffic control center

a. Operation console	2
b. Control console	1
c. Radar station system	1
d. Radar image processor	1

e. Information management system 1
f. Signal station system 1
g. VHF and radio link 1
h. Associated equipment 1

b) Signal station
a. Signal station system 2
b. Associated equipment 2

(iii) Main Services

a) Information service

a. Communication

Communication will be made by VHF radio, Perumtel telephone, pilot radio, etc. with ships, ships agents, pilot stations and so on. A reporting line will be established near the entrance to Belawan Channel for over a certain size ships to report on their name and so on.

b) Contents of services

a. Status of signal control and forecast
b. Traffic status in the area
c. Dredging works situation
d. Water depth
e. Anchorage situations
f. Warning for collisions, strandings, etc.

c) Signal control

a. Control method

Report will be made on the estimated time of approval by over a certain size of ships by noon, one day before the estimated time of entry into the control areas so as to establish a navigation plan avoiding face-to-face navigation in the specified areas, and the signal control will be carried out accordingly.

b. Contents of control

The traffic control will be carried out by signals for over a certain size of ships in the West Channel and Tg.Perak port for avoidance of face-to-face navigation.

d) Organization

a. Responsibility

The operation of the traffic control system will be the responsibility of Harbour Master unit in Belawan.

b. Organization

Head : 1
Deputy : 1
Operation : 2 tables x 2 person x 3 teams = 12
Maintenance: 2
Total : 16

e) Ships for control

a. Criteria of determining the size of ships for control
Same as for Surabaya

b. Criteria for size of ship to be placed under control in Belawan
Narrowest width of channel: 100 m
Compulsory pilotage : 88 GRT
Accordingly,
Z = 1,000 GRT
Y = 500 GRT
X = 88 GRT

(3) Jakarta (Tg.Priok)

(i) Issues on maritime safety and the countermeasures

There are few specific issues to be raised pertaining to the traffic safety in Tg.Priok. However, in view of the development in the future, further increase will be considered in the traffic density. Accordingly, information service will be carried out for ships through surveillance by radar.

(ii) Facility/Equipment Plan

Traffic control center

a. Operation console
b. Radar station system
c. Information management system
d. VHF and radio link
e. Associated equipment

(iii) Main services

a) Ship movement

A reporting line will be established near the edge of surveillance radar for compulsory pilotage ships to report on their names, tonnage, length, draft, etc.

b) Contents of services

a. Movement of other ships
b. Traffic status in and outside the port
c. Estimated time of arrival of pilots
d. Warning for collisions, strandings, etc.

c) Organization

a. Responsibility

The operation of the traffic control system will be the responsibility of Harbour Master unit in Tg.Priok.

b. Organization

Head	:	1
Deputy	:	1
Operation	:	2 persons x 3 teams = 6
Maintenance	:	1
Total	:	8

8.3.2 Legistorial Measures

Traffic control services will be effectively carried out through implementation of legistorial measures as given below:

(1) Over a certain size of ships in and out of channel and/or port shall follow the control signal.

(2) The above ships shall report to the head of Center on names, tonnage, draft, category of ship, ETA, etc.

(3) Notification shall be made on control areas.

(4) Notification shall be made on the position of signal stations kind of signal and so on.

(5) A reporting line should be established near the entrance to Channel.

(6) As regards the monitoring of ships movement, certain regulations need to be established for reporting on ships crossing on a reporting line.

8.3.3 Study and Training of Staff

Necessary measures need to be taken to carry out special training on traffic control system. The training should consist of the subjects of maritime traffic, maritime safety, information, maritime affairs, communications, electronic control as well as practices.

9 Education and Training System for Maritime Safety and SAR Personnel

Section 9 Education and Training System for Maritime Safety and SAR Personnel

9.1 Present Situation

The present status of education and training of maritime safety and SAR personnel is described in the two maritime safety aspects of the missions and the education and training.

9.1.1 Maritime Safety Personnel

For Indonesia being a vast maritime nation, the tasks of securing the maritime safety and protecting the natural environment are vitally important for planning of the national development in appropriate utilization of the ocean, and also for the international cooperation pertaining to the maritime safety as a whole.

Especially, the maritime sector development has been implemented in REPELITA III to REPELITA IV, and the development in shipping and ports as well as the ocean development have made a remarkable progress.

In view of the above, the needs for the development of maritime safety in and around the Indonesian territorial waters have further increased. The Directorate General of Sea Communication has the sole responsibility for the maritime safety services represented primarily by the three maritime safety-related Directorates of Sea and Coast Guard as the key maritime safety and SAR task forces, Navigation as the responsible body for navigational aids and maritime communications and Maritime Safety in charge mainly of the safety of ships and marine environment preservation.

The field survey for the actual status has revealed the following issues: although the scope and contents of maritime safety services are to decided through the harmony of three key elements of the organizational system, personnel and facilities, the present situations in this content summarize that a number of issues have come up to surface in the light of national attitudes towards ocean recently being faced by the littoral nations.

Namely, the issues of efficient system for search and rescue, of ocean environment protection, of internationalization of ocean, of shortage in facilities such as patrol ships, etc., and of shortage in number of the competent maritime safety officers to be in charge of various matters concerning ocean. The present status is such that the tasks of maritime safety personnel are mostly limited to in or around port operations and various issues covering the entire Indonesian waters have not been effectively covered.

The number of personnel in the three Directorates who engage in the maritime safety services comprises:

DGSC total personnel	13,083
Directorate of Sea and Coast Guard	3,713
Directorate of Navigation	4,116
Directorate of Marine Safety	2,396
Three Directorate total personnel	10,225

The marine safety-related three Directorates occupies about 78% or whole DGSC personnel constituting the thick central pillar in manpower. This means that security has been made in the human resources for the maritime safety services. However, the manpower composition by education shows that the presently available human resources in the Directorates are the graduates from the institutes of navy, and merchant marine, and those from the junior and senior high schools of general education. Therefore there are an extremely small number of personnel who have the competent knowledge and skill required specifically for the maritime safety services.

The personnel holding the certificates of mariner and radio operators, which are required for the maritime safety officers who work at sea, number only 1,071 and 1,144 respectively even in total of various classifications of the certificates, and extremely small number of 221 personnel out of the 1,071 mariner certificates are the high grade certificate holders.

Such situations as described above seem to have had unfavorable impact over the execution of maritime safety tasks and services, while on the other hand a concern may be raised to see the problematic issue of recruiting the maritime safety personnel.

That is to say, when due consideration is paid to the background of the manpower requirement for maritime personnel proposed in the Maritime Sector Training Project, August 14, 1986 and the development of shipping and ports in REPELITA IV as well as to the declining trend in youngsters willing to be seamen, not much expectation may be imposed on the graduates of the Merchant Marine Academies to be the maritime safety personnel, and further the graduates from the Naval Academies may not form a stable source of recruitment for DGSC personnel.

Taking the above situations into full account, annual recruitment of a certain number of competent maritime safety personnel in DGSC may be presently regarded as difficult to attain.

9.1.2 Maritime Safety Personnel and Their Education and Training

(1) Education and Training of Maritime Safety Personnel.

The general situations are such that the maritime safety personnel in DGSC presently at work have acquired and comprehended the maritime safety services partially through the field services and operations, and that they are placed under rather difficult conditions and environment to acquire the highly specialized knowledges and skills in the multi-fumctional maritime safety and SAR services such as security of the safety and order at sea and preservation of natural environment.

(2) Education and Training of Seamen

Views may be presented from the standpoint of maritime safety on the merchant marine institutes and schools which provide the education and training for the merchant marine seamen currently constituting the main manpower element of maritime safety officers in DGSC.

The Education and Training Center of Sea Communication is the responsible authority for the national and private maritime institutes and schools for the education and training of seamen. Namely,

- Establishment of education and training programs for maritime personnel
- Development of curricula, instructional methods, training materials and supplies
- Supervision for program implementation by institutes

There are four levels of education and training institutes and schools under the Education and Training Center of Sea Communication comprising:

Maritime Institute	:	1 Institute
Merchant Marine Academy	:	3 Academy
Rating School	:	1 School
Marine Technical College	:	1 College

In each institute, education is carried out according to the STRATA system for the seamen for oceangoing and domestic shipping qualifications. In addition to the above, there are a pilotage institutes and over 20 private merchant marine institutes.

The maritime educational system in Indonesia is as shown in Fig. 9-1-1.

A number of issues may be raised from the view-points of whether the maritime educational and training institutes are the bodies to educate and train the maritime safety specialists who make approach to various maritime aspects from multidirections of civil, social and natural science fields.

Organization Chart for Marine Education and Training Institute

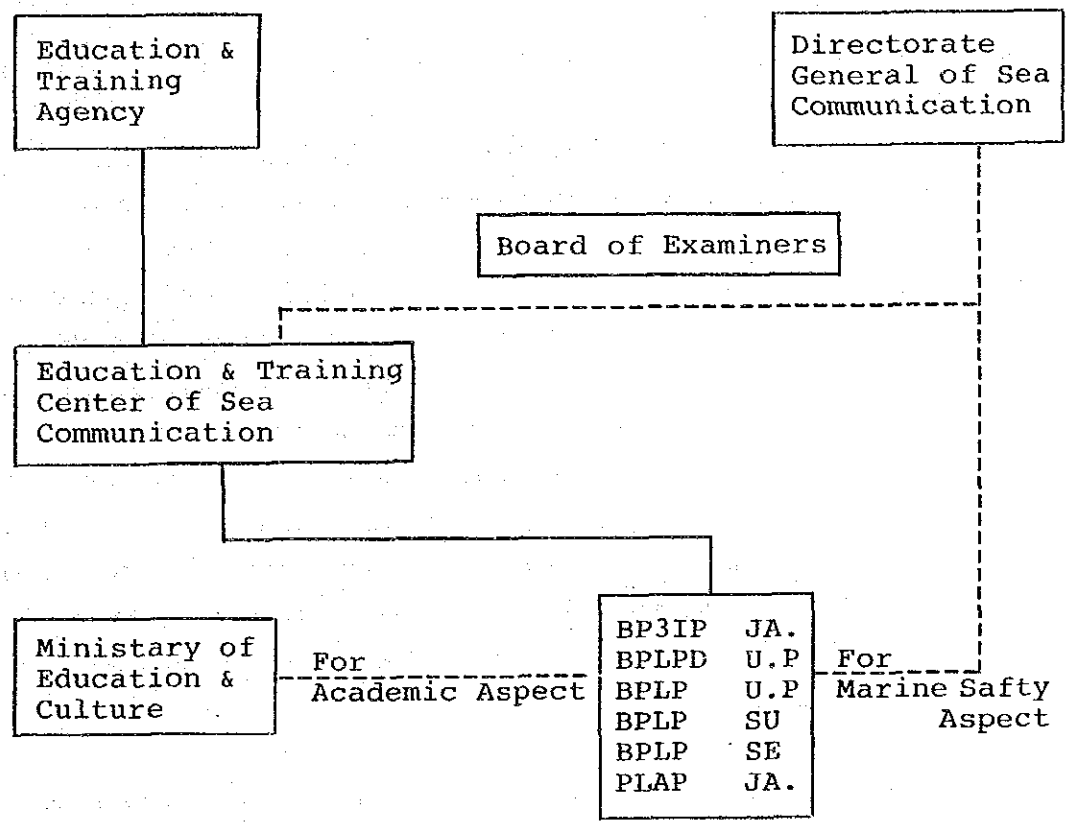


Fig. 9-1-1 Organization Chart for Marine Education and Training Institute

The on-site surveys on the facilities and training materials and supplies have found that the training equipment and instrument with which the cadets acquire the technical expertise through the experiment and practice are rather old fashioned and in shortage despite that the highly advanced technology has already been in field use for maritime sector.

It is also a serious problem that the institutes do not own the training ships for exclusive use. Experience of sea life on board is a fundamental necessity, and one of the basic educational subjects for maritime safety personnel. The above are the views on seamen education being carried out at the merchant marine institutes. The prime purpose of seaman education is no doubt to provide the cadets with the expertise and skill on operation of ships, and the relevant management for them to work for shipping enterprises participating is profit-making services, while the capability of operating patrol ships by maritime safety personnel is one of the powerful means of pursuing their duties and their main missions are to serve for the line of national policy on maritime safety patrol, search and rescue, protection of ocean environment. It may, therefore, be proven very unnatural and inappropriate to regard the educational system for merchant marine as the objectives of a system for the education of maritime safety personnel.

9.2 Issue on Education and Training for Maritime Safety and SAR Personnel

Those who work for the Directorate of Sea and Coast Guard and its subordinate field organizations require the working knowledge on maritime law enforcement, technical and operational knowledge and expertise on operating SAR, maneuvering the patrol ships, combatting oil pollution and fighting fires, and so on.

Those who work for the Directorate of Navigation and its subordinate field organizations require the technical and operational knowledge and expertise on, for the safety of navigation, planning the aids to navigation, maneuvering the ships, surveying sea, and also the working knowledge on maritime law enforcement. The ships and personnel under this Directorate participate, whenever required, in the maritime safety and SAR activities.

Those who work for the Directorate of Marine Safety and its subordinate field organizations require the professional skill and knowledge on the relevant certificates issuance, the working knowledge on maritime law enforcement, technical and operational knowledge and expertise on maneuvering the ships, supporting SAR operations.

9.3 Long-term Development Plan

The Directorate General of Sea Communication has responsibilities for securing the maritime safety widely covering sea and harbour patrol, ships safety, maritime traffic, maritime law enforcement, navigation, maritime SAR telecommunications, and so forth.

The biggest part of the total number of operational DGSC personnel are those who work for the maritime safety, primary for the Directorates of Sea and Coast Guard, Navigation and Marine Safety.

The personnel who have been carrying out the maritime safety duties in DGSC are mostly those who hold merchant marine certificates, that need much more expertise training to be qualified as maritime safety officers in carrying out multifunctional maritime safety operational and support duties.

Both the rapid development of maritime safety technology and the recent internationalization of maritime safety especially SAR have necessitated the immediate development of the expertise human resources who will extensively work for humanitarian activities of maritime safety including search and rescue at sea. There have so far been no expertise education and training being carried out in Indonesia specifically meeting the continuous requirements of personnel qualified in maritime safety duties of DGSC.

9.3.1 Establishment of DGSC Academy

(1) Necessity of Establishing DGSC Academy

(i) The main missions and duties of maritime safety personnel cover such extensive areas as maritime of marine accidents, securing the safety of navigation at sea, maritime safety law enforcement, etc.

(ii) In other words, the maritime safety personnel are responsible for overall matters of securing the safety of navigation at sea, and those who are with the maritime safety-related Directorates should work integratedly deploying their full efforts and corporation.

(iii) The maritime safety personnel will also stand in a position to be a controller or implementing officer in such cases as natural calamity and disaster, riot, etc., and even under such conditions, they have to execute their duties, for which solid discipline and severe training are inevitably required together with sound body and strong spirit.

(iv) The expertise knowledge and skill to form the fundamentals shall be to the practical extent that they will be capable of operating ships, handling engines and communications equipment, administering aids to navigation services, law enforcing, executing administration and management including personnel matters, and so on.

(v) In order to master the above, considerable length of time will no doubt be required. The training to be a controller or implementing officer shall be carried out in group simultaneously with the special training on continuous basis for the individual personnel to be an integral part of the group.

(vi) It is expected that those who will have the special education and training as described above may assume responsibility in any post of the maritime safety services, cope with emergency situations like as a implementing officer, and perform the DGSC's maritime safety services in a controlled way with assured discipline.

(vii) Especially, those who will be senior maritime safety officers will be required to acquire the expert qualifications, and for this purpose, the DGSC academy should be placed in the highest institutional position in the field of maritime safety in Indonesia.

(viii) The education and training for extensive fields to be covered by the maritime safety personnel do require considerable length of period under the discipline of alert mind and sound body. It is, therefore, necessary that about four years education will be conducted for the graduates from senior high school, as it has been in practice in the USCG Academy and the Maritime Safety Academy in Japan.

(2) Admittance Qualifications and Requirements

The admittance qualifications for the candidate cadets of DGSC Academy should be in strictly conformity with the spirit and basic philosophy forming the basic of establishing the DGSC academy stressing total development as a person and as a leader, physically fit, studious, honest, courageous and having alert of mind.

It is accordingly considered appropriate for the cadets candidates to fulfill the following requirements:

(i) An Indonesian nationality having religion.
(ii) The age is minimum 18 years, maximum 24 years of the graduates from senior high school.
(iii) Having good attitude.
(iv) Unmarried and won't be married during attending education.
(v) Having certificate of senior high school in mathematics and pure sciences for nautical department.
(vi) Having certificate of senior high school in mathematics and natural sciences or senior technical school in general engine for technical department.
(vii) The height of the body is minimum 160 cm.
Weight 50 kg
Good at hearing and vision
Good physical health

(viii) Passing the selection test, i.e.:

a) Achievement test
b) Physical fitness test
c) Interview
d) Medical test
e) Psychotest/I.Q. test

Reference has been made to admittance requirements of candidate cadets for the Merchant Marine Academies and Naval Academy from the view point of the national standardization in admittance qualification and of providing equal opportunity candidate cadets with.

(3) Duration of education and curriculum

Reference has been made to the duration of education and the curriculum at the other institutes similar to the DGSC Academy in terms of the special establishments such as the Naval Academy, Merchant Marine Academies and so on as compared below:

The curriculum is solely dependent on the duration of education. Following gives the comparison on the curriculum of the relevant institutes.

	Merchant Marine (Indonesia)	U.S. CG Academy	Maritime Safety Academy (Japan)
Duration of Education	3 years (STRATA-A)	4 years	4 years
Number of Units	General basic course: 11		General education: 52
Number of Units	Basic major course: 23.5		Basic professional subjects: 75
Number of Units	Major course: 82.5		Professional subjects: 70-73
	Total: 117		Total: 197 - 198

The detailed curriculum is proposed as given in Table 9-3-1.

Table 9-3-1 Proposed Curriculum for DGSC Academy (1/4)

I.	General Education	(40)	
	1. Humanities	(8)	
	1) Religion	2	Compulsory
	2) Ideology of Indonesia	2	"
	3) Literature	2	Elective
	4) Psychology	2	"
	5) History	2	"
	2. Social Sciences	(8)	
	1) Constitution	2	Compulsory
	2) Jurisprudence	2	"
	3) Politics	2	"
	4) Economics	2	Elective
	5) Sociology	2	"
	6) Statistic	2	"
	3. Natural Science	(8)	
	1) Mathematics I	3	Compulsory
	2) Mathematics II	1	"
	3) Physics and experiment	4	Elective
	4) Chemistry and experiment	4	"
	4. Foreign Language	(12)	
	1) English I	4	Compulsory
	2) English II	4	"
	3) Foreign Language	4	"
	5. Health and Physical Education	(4)	
	1) Lecture	2	Compulsory
	2) Physical Exercise	2	"
II.	Basic Professional Subject	(54)	
	1) Applied Mathematics	2	Compulsory
	2) Administration Law	4	"
	3) Civil Law	4	"
	4) Commercial Law	4	"
	5) Criminal Law	4	"

Table 9-3-1 Proposed Curriculum for DGSC Academy (2/4)

6)	Criminal Procedure Code	4	"
7)	International Law	4	"
8)	Maritime Police Law	2	"
9)	Maritime Criminal	2	"
10)	Maritime Traffic Administration	2	"
11)	Maritime Safety Management	2	"
12)	Ocean Environment Law	2	"
13)	Operations Research	2	"
14)	Maritime Safety Engineering	2	"
15)	Theory of Search	2	"
16)	Meteorology	2	"
17)	Oceanography	2	"
18)	Information Theory	2	"
19)	Information Processing and Exercise	1	"
20)	Research Work	4	"
III. Professional Subjects			
1.	Navigation Course	(54)	(Elective Compulsory)
1)	Geo-Navigation and Exercise	4	Compulsory
2)	Celestial Navigation and Exercise	4	"
3)	Electronic Navigation and Exercise	3	"
4)	Nautical Instrument and Exercise	6	"
5)	Ship Maneuvering and Exercise	6	"
6)	Ship Safety Maintenance	4	"
7)	Maritime Law	4	"
8)	Rescue Engineering	4	"
9)	Oceanography Meteorology	3	"
10)	Naval architecture and Exercise	9	"
11)	Marine Hydro-dynamics	2	"
12)	Electronics and Exercise	3	"

Table 9-3-1 Proposed Curriculum for DGSC Academy (3/4)

2.	Engineering Course	(52)	(Elective Compulsory)
	1) Material Dynamics	2	Compulsory
	2) Industrial Material	2	"
	3) Machine Work	2	"
	4) Workmanship	1	"
	5) Mechanical Engineering	1	"
	6) Mechanical Dynamics	3	"
	7) Mechanism	1	"
	8) Mechanical Design and Exercise	3	"
	9) Drawing	2	"
	10) Automation and Exercise	3	"
	11) Steam Engine and Boiler and Exercise	3	"
	12) Internal Combustion Engine	4	"
	13) Auxiliary Engine and Exercise	3	"
	14) Fuel and Lubricating Oil	2	"
	15) Combustion Science	1	"
	16) Industrial Thermo-dynamics	3	"
	17) Hydro-dynamics	2	Compulsory
	18) Propulsion	2	"
	19) Mechanical Engineering and Experiment	1	"
	20) Electronical Engineering	5	"
	21) Marine Electronical Mechanics	2	"
	22) Marine Electronics	2	"
	23) Electrical Engineering and Experiment	1	"
	24) Marine Engine Handling	1	"
3.	Communications Information	(52)	(elective Compulsory)
	1) Applied Mathematics and	3	Compulsory
	2) Electro-Manetism	5	"
	3) electrical Circuit	2	"
	4) Solid State Physics	2	"

Table 9-3-1 Proposed Curriculum for DGSC Academy (4/4)

5)	Electronic Device	2	"
6)	Electric Circuit Experiment (Introductory Level)	1	"
7)	Electronics Circuit, Exercise and Experiment	5	"
8)	Electronical Measurement I	3	"
9)	Electronical Measurement II	2	"
10)	Electromagnetic Wave Transmission Engineering	2	"
11)	Antenna Engineering	3	"
12)	Radiowave Propagation	2	"
13)	Radio System and Apparatus and Exercise	4	"
14)	Electronic Navigation	3	"
15)	Radio System and Experiment	2	"
16)	Radio Law and Exercise	3	"
17)	Communication System	1	"
18)	Electronic Control Engineering	2	"
19)	Information Theory	2	"
IV. Training Subjects		(15)	
1)	Gunnery	3	Compulsory
2)	Swimming During and First Aid Measures	4	"
3)	Boat Training and Visual Signalling	4	"
4)	Arrest Training and Allout Command Training	2	"
5)	Communication Operation and Practices	2	"
V. Cruise Training			
Total period of one year in four years education.			

(4) Status of Cadets and Compulsory Dormitory

(i) Status of cadets

The cadets of DGSC Academy, who will be different from those of educational institute for merchant marine personnel who will be free in choosing their occupations, will receive special education with the sense of purpose to work for their nation after graduation as maritime safety officers.

(ii) Compulsory dormitory life

The daily activities of cadet life in the dormitory will be almost the same as in the similar institutes like the Merchant Marine Academies and the Naval Academy.

(5) Facility and Equipment Plan

The facilities and equipment to be required for the DGSC Academy comprise the main buildings and associated facilities, and the training equipment and materials.

(i) Facility plan

The plan is made for the facilities as described below:

a)	Site areas:	150,000 m^2
b)	Main hall, class rooms and Laboratories 200 persons x 30 m^2:	6,000 m^2
c)	Auditorium/gymnasium 200 persons x 10 m^2:	2,000 m^2
d)	Library 200 persons x 1.5 m^2:	300 m^2
e)	Dormitory, Dining Room, Medical Room 200 persons x 17 m^2:	3,400 m^2
f)	Pier 80 m:	1 set
g)	Swimming pool 50 m x 6 courses	1 set

h)	Training facilities for casualty prevention	1 set
i)	Boat house and garage	500 m^2
j)	Others	

(ii) Educational equipment and materials

A plan is proposed for the teaching equipment and materials as given below:

a) Basic Subject Course

a.	Subject of physics and chemistry	
	- Experimental instruments for physics	1 set
	- Experimental instruments for chemistry	1 set
b.	Subject of foreign languages	
	- The equipment for practice of languages	1 set
c.	Subject of health and physical education	
	- Sporting goods	1 set

b) Basic Professional Subject Course

a.	Apparatus for rescue of casualties	1 set
b.	Apparatus for judgment	1 set
c.	Fire fighting facilities for vessels	1 set

c) Professional Course

a.	Navigation course	
	- Chart work apparatus	1 set
	- Navigational equipment and instruments	1 set
	- Operation Instruments	1 set
	- Meteological observation instrument	1 set

b. Engineering course

- Tooling machinery materials experiment equipment	1 set
- Drafting instruments	1 set
- Engine for vessels	1 set
- Electrical equipment for vessels	1 set

c. Communications course

- Electric measuring instruments	1 set
- Communications equipment	1 set
- Radio navigation equipment	1 set
- Lavaratory equipment of electrical engineering	1 set

d) Training Course

- Boats	1 set
- Diving apparatus	1 set
- Signalling apparatus	1 set

(iii) Training ship

The method presently taken by the Merchant Marine Academies, in which the cruising training is carried out on board private merchant vessels, is feared that the period has its limitation and the characteristic education specific to the maritime safety officers will be faded out. Therefore, to dedicate a training ship to the DGSC Academy will be one of the minimum requirements to be fulfilled. The training ship will have necessary capacities to cope with long distance endurance navigation to overseas, through which the cadets will be trained to have international sense and views.

(6) Administration and management of DGSC Academy

(i) Administration and management of DGSC Academy

The proposal is made in Fig. 9-3-1 in a form of chart for reference purposes regarding the administration and management organization of DGSC Academy.

(ii) Number of Instructors

The number of instructors is proposed in Table 9-3-2 pertaining to the subjects.

Table 9-3-2 Number of Instructors Proposed for DGSC Academy

Subject	No.	Subject	No.
Humanities & social science	2	Operation	3
Natural science	3	Naval engineering	1
Foreign languages	3	Mechanical engineering	2
Laws	2	Engine	2
Administration management law	1	Marine electrical engineering	2
Maritime police law	2	Electronic engineering	2
Maritime safety engineering	1	Electronic circuit	2
Rescue and anti-disaster	2	Communication equipment	2
engineering		Training	5
Hydrography	1		
Navigation	2	Total	40

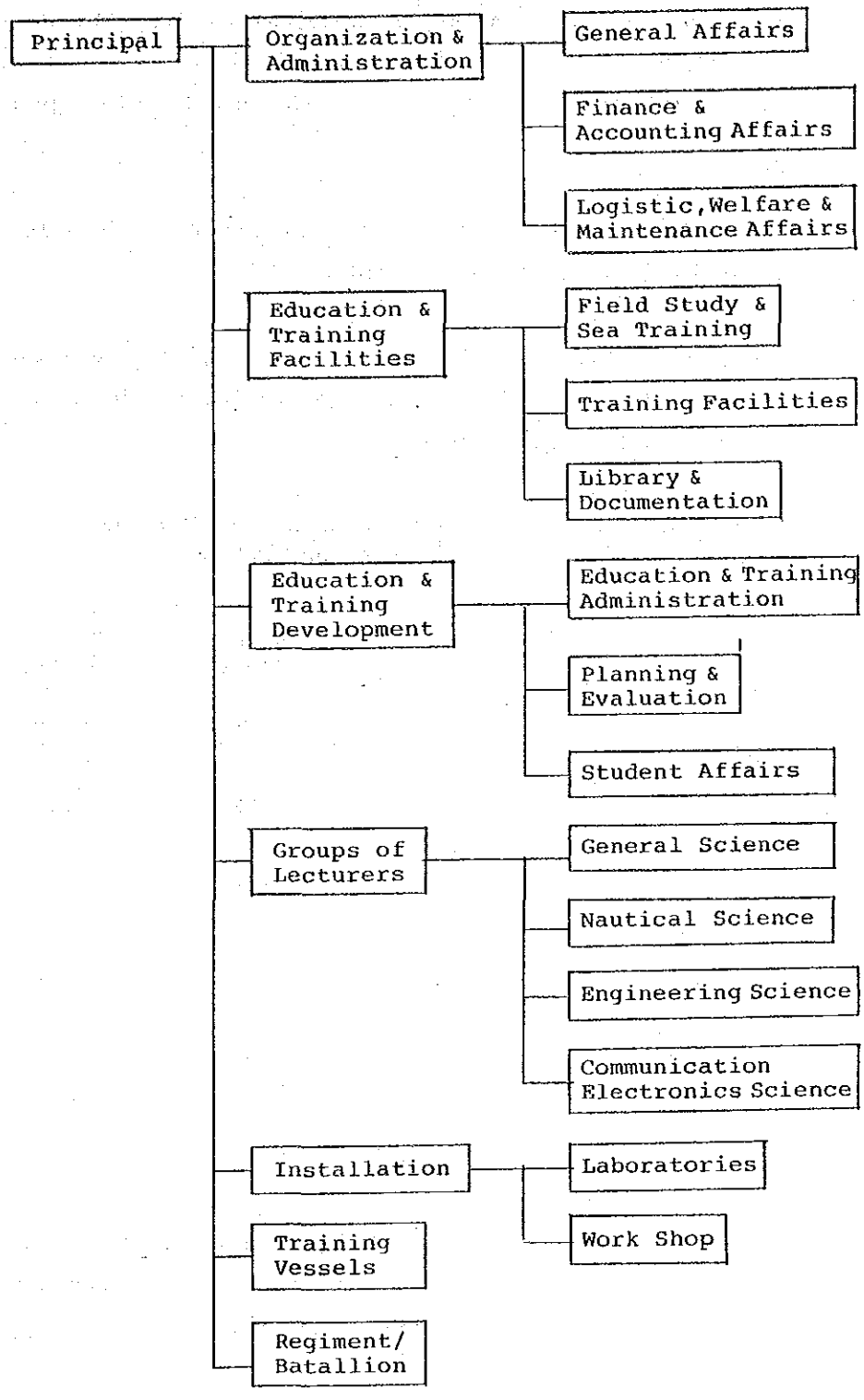


Fig. 9-3-1 Administration and Management Organization of DGSC Academy

The above may be referred to the similar establishments, i.e. the Maritime Safety Academy in Japan; about 300 cadets in total have been studying under the teaching staff of about 60, giving the number of cadets per lecturer at 4.84.

This ratio is higher than that prevailing in general education due obviously to the specialized educational fields.

On the other hand, the number of lecturers in maritime education and training institutes in Indonesia has been investigated as shown in Table 9-3-3, which gives 8.42 person per lecturer.

Table 9-3-3 Number of Lecturers and Cadets of Maritime Education and Training Institutes

Item / Institute	No. of Lecturers (A)	No. of Cadets (B)	Ratio (B)/(A)
Merchant Marine Academy (Jakarta)	66	677	10.26
Merchant Marine Academy (Semarang)	88	702	7.98
Merchant Marine Academy (Surabaya)	52	222	4.37
Merchant Marine Academy (Uj. Pandang)	50	555	11.10
Total	256	2,156	8.42

(iii) Training system for the instructors

To secure competent personnel suitable for education and training of maritime safety officers will be very difficult as may be seen from the examples of the education for merchant marine personnel.

It is, therefore, necessary to develop the training system for the instructors in order to secure the competent faculty.

The instructors of DGSC Academy will be divided into the two groups of general educational subjects and professional subjects, and they will have the educational careers as given below:

a) Instructors for general educational subjects; BA, BS graduates of universities

b) Instructors for professional subjects; Graduates of DGSC Academy, etc.

Several approaches may be considered in establishing the instructor training system:

a. To follow the existing system of instructor training.
b. To provide the graduates of DGSC Academy with further education to be instructors by sending them to the domestic institution or others.
c. To implement the system of studying or training abroad.
d. To invite the foreign experts as guest instructors.

(7) Running cost of DGSC Academy

The surveys in this respect show that the annual running costs for Merchant Marine Academies range from about one million to 2.6 million Rupiah.

(i) The annual running costs for merchant marine institutes are as shown below according to the allocation of 1987 budget, giving the annual average of about one million Rupiah per cadet:

(Unit: Rp x 1,000)

Institute	Annual Budget	No. of Cadets	Annual Average per Cadet
Merchant Marine Academy (Jakarta)	665,257	677	981
Merchant Marine Academy (Semarang)	630,901	702	899
Merchant Marine Academy (Uj. Pandang)	325,005	555	582
Merchant Marine College (Baronbon)	228,224	105	2,174
Average Cost	1,848,387	2,039	907

(ii) According to the data shown in the guidebook of Merchant Marine College, Semarang, the running cost per cadet gives the highest side of 2.6 million Rupiah per annum.

When the above figure are applied to the DGSC Academy, the approximate annual running costs will be estimated as follows:

a) Based in 1) above,

Rp 1,000,000 x 200 cadets = Rp 200 million
Rp 600,000 x 200 cadets = Rp 120 million
Others 10% of above = Rp 32 million
Total Rp 352 million

Since further costs such as on board training are be incurred the annual costs will be about Rp 450 million.

b) Based on 2) above;

Rp 2,600,000 x 200 cadets = Rp 520 million

Accordingly, the annual running costs of DGSC Academy will be estimated within the range of Rp 450 to 550 million Rupiah for 200 cadets.

10 Maritime Safety and SAR Organizational System

Section 10 Maritime Safety and SAR Organizational System

10.1 Present Situation

The Republic of Indonesia, being major maritime nation, should be capable of accommodating the interests of international, national and regional shipping in and around its territorial waters, besides also in fulfilling the obligations as stipulated in the relevant international conventions and regulations to secure safe, orderly, smooth, and efficient sea transportation. The Ministry of Communications, represented by the Directorate General of Sea Communication, assumes the responsibilities for the maritime safety in Indonesia including SAR.

10.1.1 Legal Provisions and Regulations concerning Organizations

The legal provisions and regulations for the organizational structure of the Ministry of Communications and Directorate General of Sea Communication are primarily based on the Presidential Decrees and the Minister of Communications Decrees concerned as given below.

- Presidential Decree (KEPPRES) 44/74
  Organization structure of the Government of Indonesia
- Presidential Decree (KEPPRES) 15/84
  Basic organization structure of the Ministers of the Government of Indonesia
- Minister of Communications Decree KM.164/OT.002/Phb-80
  Reinforcement of the Organization and Work Procedure of DGSC
- Government regulations 23 of 1985
  Amendments on Government Regulation 11 of 1983 on Port Administrator's Office
- Minister of Communications Decree KM.89/OT.002/Phb-85
  Organization Structure and Work-procedure of the Port Administrator Office
- Minister of Communications Decree KM.184/OT.002/Phb-85 Authorities of Harbour Masteries

10.1.2 International Covenants concerning Maritime Safety

Ratification has been made by the Government of the Republic of Indonesia for the main maritime safety concerned International Conventions such as SOLAS 1974, COLREG 1972 and so on, while other Conventions are in process for their ratification which include MARPOL 1978 and STCW 1978. Preparatory work is now in process for ratification of the SAR Convention. The details are as described below.

(1) In relation to 1979 SAR Convention

The provisional SAR plan around Indonesia predominantly covers the surrounding of the Indonesian water areas where are encompassed the oblique lines as shown in Fig. 10-1-1. All maritime nations are encouraged by IMO to adopt the implement the SAR Convention 1979 through the resolution.

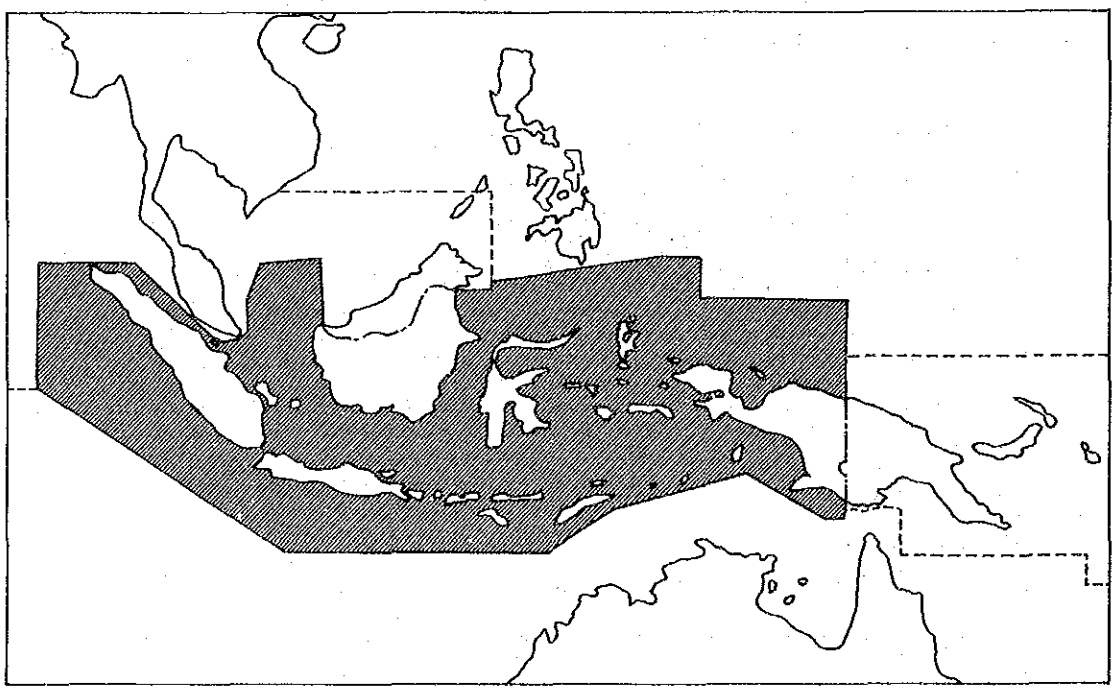


Fig. 10-1-1 Provisional SAR Plan Zone

(2) Cooperation and Coordination with Neighboring Countries

International deployment, among others, the establishment of prompt cooperation and coordination with the neighboring states will lead to the realization of the effective and organic search and rescue system.

The Government of the Republic of Indonesia has concluded an agreement respectively with the Government of Papua New Guinea, the partner of eastern part, the Government of Australia, the partner of southern part, and the Government of the Republic of the Philippines, the partner of northern part in a form of either a bilateral agreement or memorandums of understanding. The agreements have already been in effect and operational, and the joint SAR exercises and SAR communication test exercises are carried out periodically with these countries.

The contents of agreements are basically in conformity with the provisions of SAR Convention covering all the necessary aspects: mutual cooperation and support for SAR activities through RCC; execution of SAR operations in the areas under the responsibility of RCC belonging to a partner nation, mutual exchange of SAR information, responsibility for the expenses incurred by its own units, issuance of a joint NOTAM or NTM to promulgate the search areas.

Annual SAR exercises are also carried out with other two neighbor coastal states of Malaysia and Singapore.

(3) International Conventions ratified by the Government of the Republic of the Indonesia

- Convention on the International Regulation for Preventing Collision at Sea, 1972 (COLREG 1972).
- International Convention for the Safety of Life at Sea, 1974 (SOLAS 1974)
- International Convention on Civil Liability for Oil Pollution Damage, 1969 (CLC 1969).

- International Convention on the Establishment of International Fund for Compensation for Oil Pollution Damage, 1971 (FUND 1971).
- International Convention on Code of Conduct for Linear Conference 1974 (Code of Conduct 1974).
- Convention on the Intergovernmental Maritime Consultative Organization, 1948 (IMCO 1948).
  a. 1975 Amendment
  b. 1977 Amendment
  c. 1979 Amendment
- United Nation Convention on the Law of the Sea, 1982 (UNCLOS 1982)

(4) In process for ratification by the Government of the Republic of Indonesia

- International Convention for the Prevention of Pollution from Ships of 1973 (MARPOL 1973) and Protocol (MARPOL 1978).
- International Convention on Standards of Training, Certification and Watchkeeping for Seafarers of 1978 (STCW 1978).

10.1.3 Organizational Systems

The Maritime safety and SAR are under the responsibility of the Ministry of Communications. The Directorate General of Sea Communication is the executing agency with the national coordination carried out by the National SAR Agency, which is also under the Ministry of Communications.

10.1.3.1 Ministry of Communications

The Ministry of Communications has the responsibilities for providing the transportation facilities and services widely covering the development of air, sea, land and inland waterways and ferry transport services, and is also responsible for meteorology and geophysics, maritime court administration and for the national search and rescue. The basic organization structure of the Ministry is defined in the Presidential Decree 15/84.
The organization chart of the Minister of Communications is shown in Fig. 10-1-2.

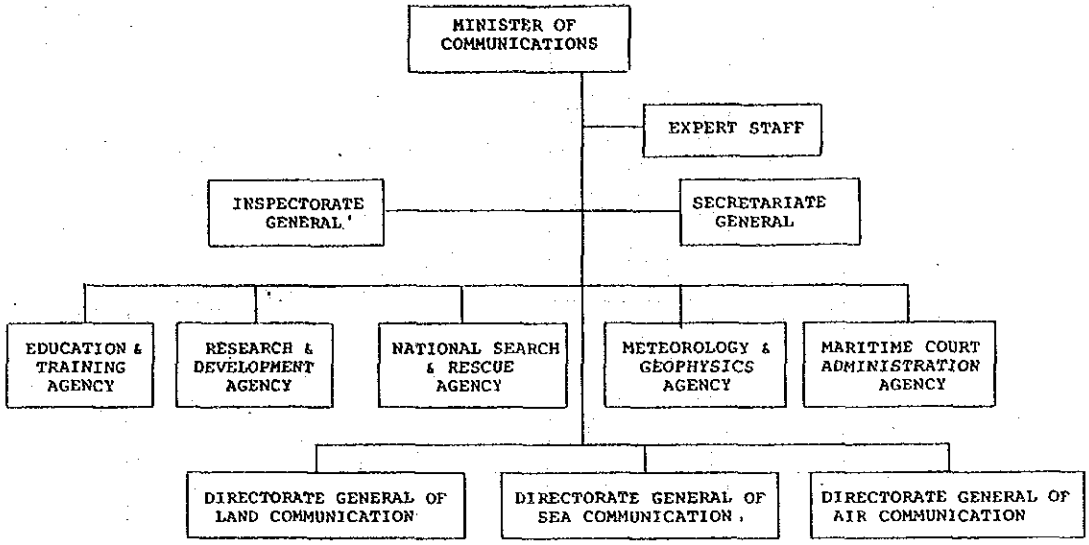


Fig. 10-1-2 Organization Chart of Communications

10.1.3.2 Directorate General of Sea Communication

KM 164/OT.002/Phb-80 provides for the overall organizational structure of the Directorate General of Sea Communication (DGSC). The main functions of DGSC cover the administration of maritime system, and the formation and execution of the policies thereof. DGSC's responsibilities for the maritime safety are primarily assumed by the three directorates of Sea and Coast Guard, Navigation and Marine Safety for the operational safety, sea worthiness and efficiency of sea transportation in Indonesia. The organization charts of DGSC and its internal systems are shown in Fig. 10-1-3 to Fig. 10-1-16.

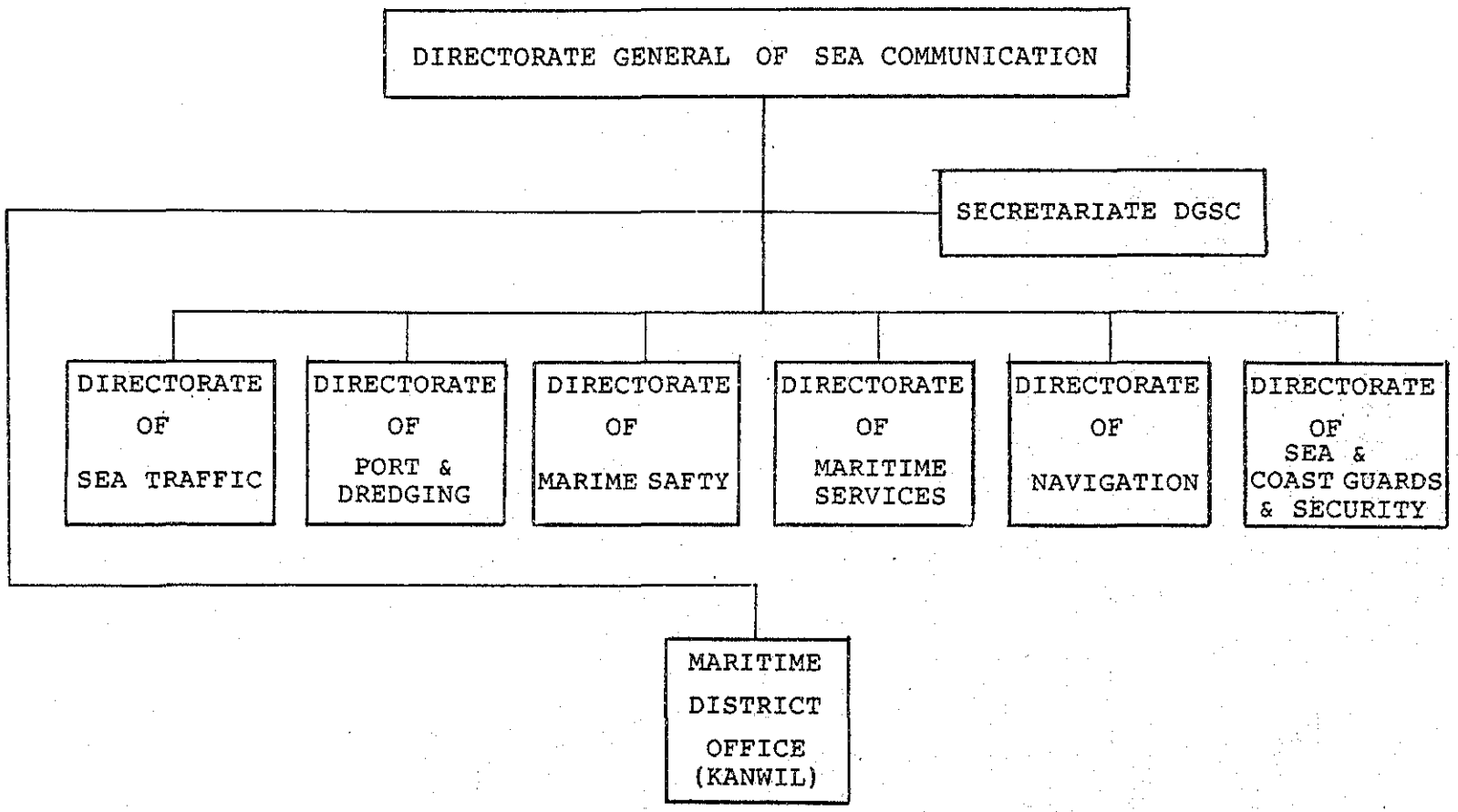


Fig. 10-1-3 Organization Chart of Directorate General of Sea Communication

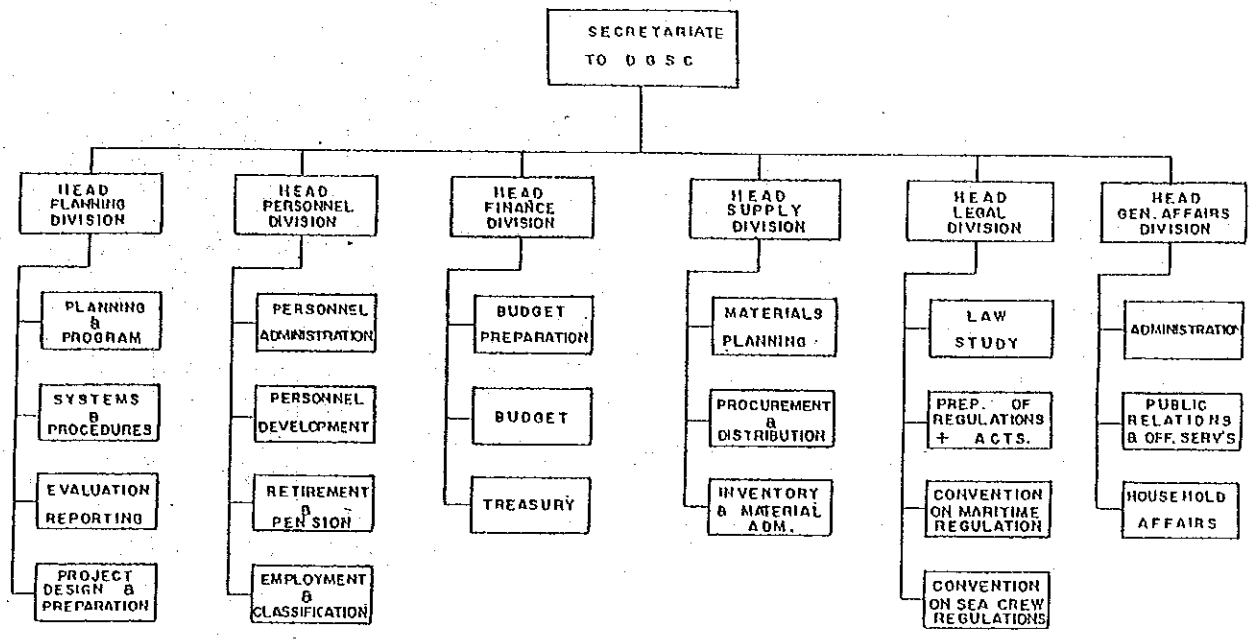


Fig. 10-1-4 Organization Chart of Secretariate DGSC

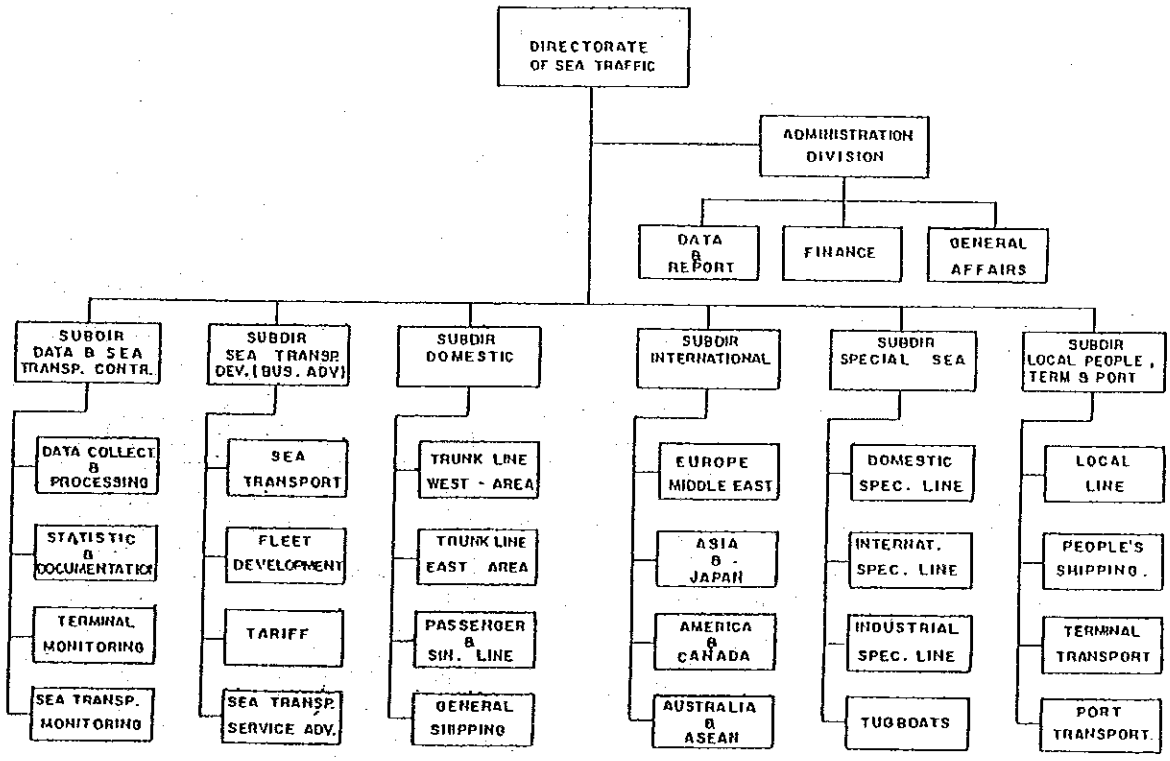


Fig. 10-1-5 Organization Chart of Directorate of Sea Traffic

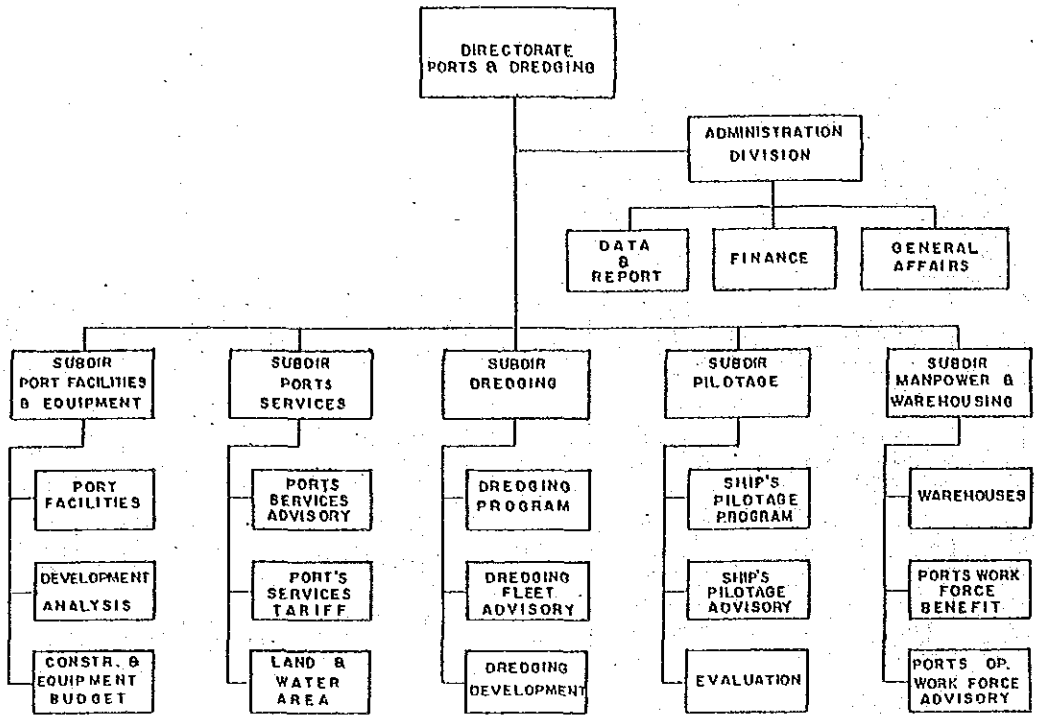


Fig. 10-1-6 Organization Chart of Directorate of Port & Dredging

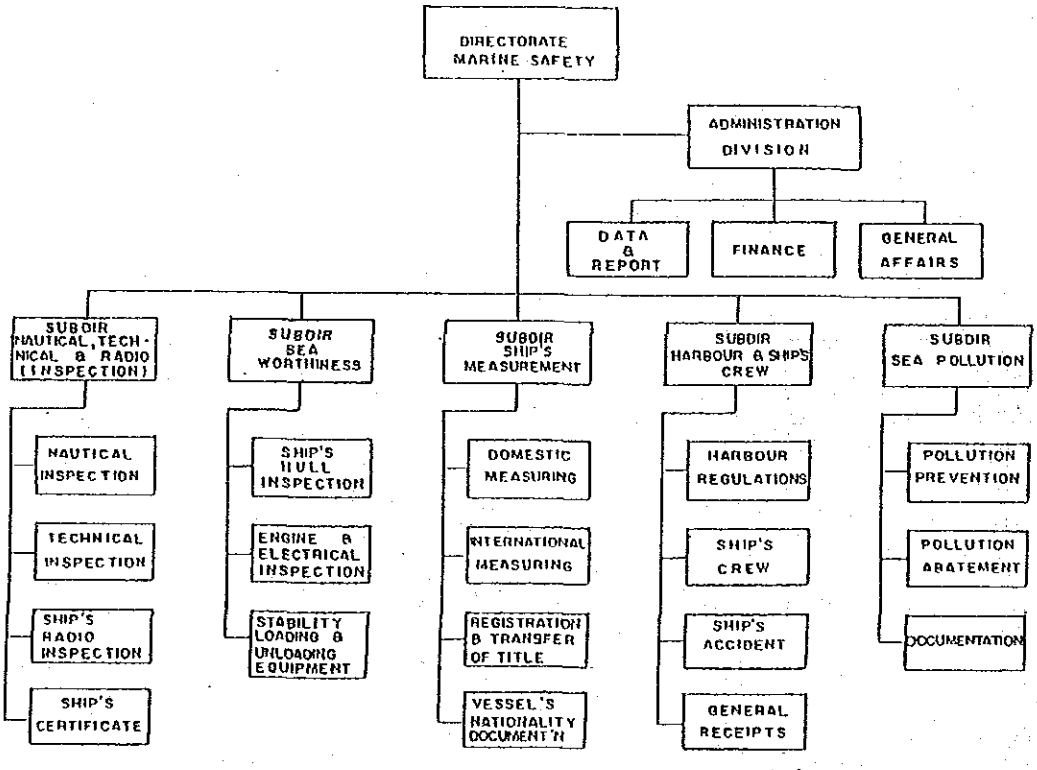


Fig. 10-1-7 Organization Chart of Directorate of Marine Safety

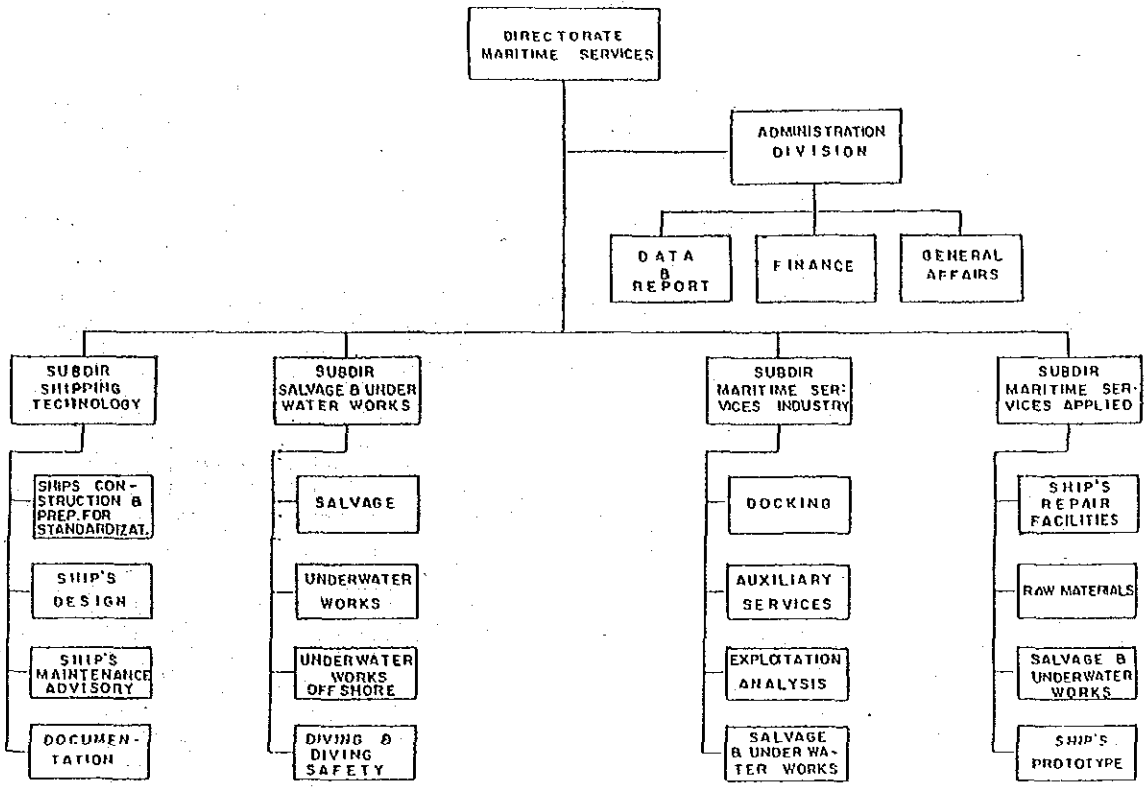


Fig. 10-1-8 Organization Chart of Directorate of Maritime Services

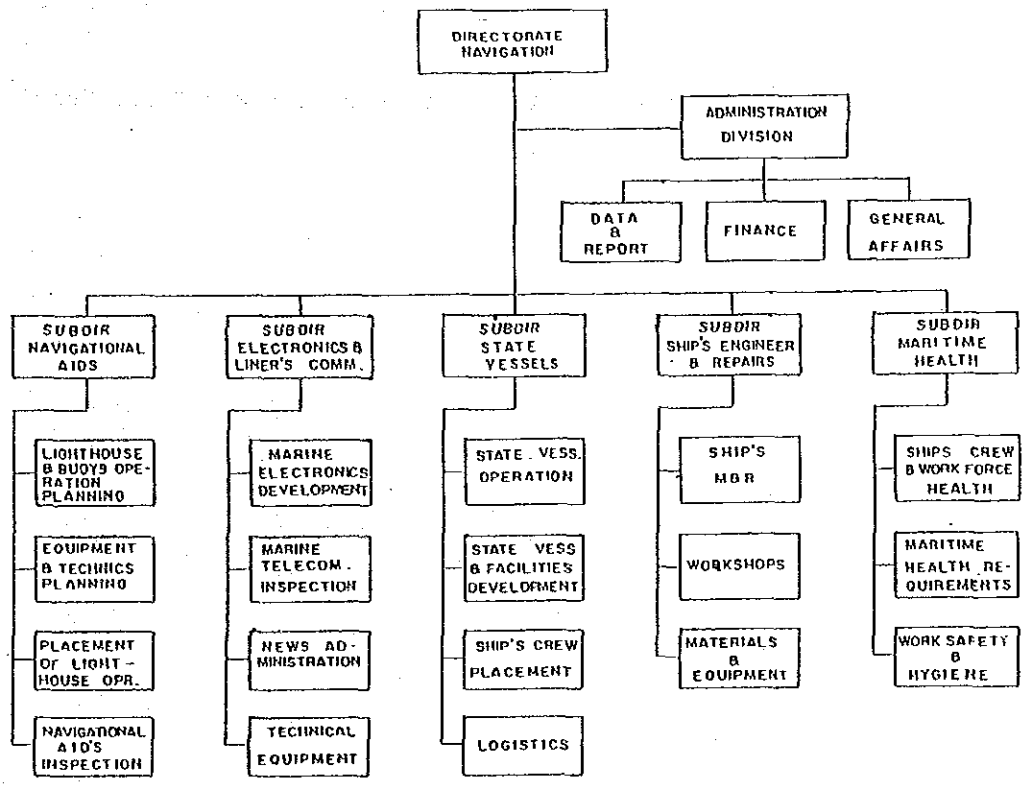


Fig. 10-1-9 Organization Chart of Directorate of Navigation

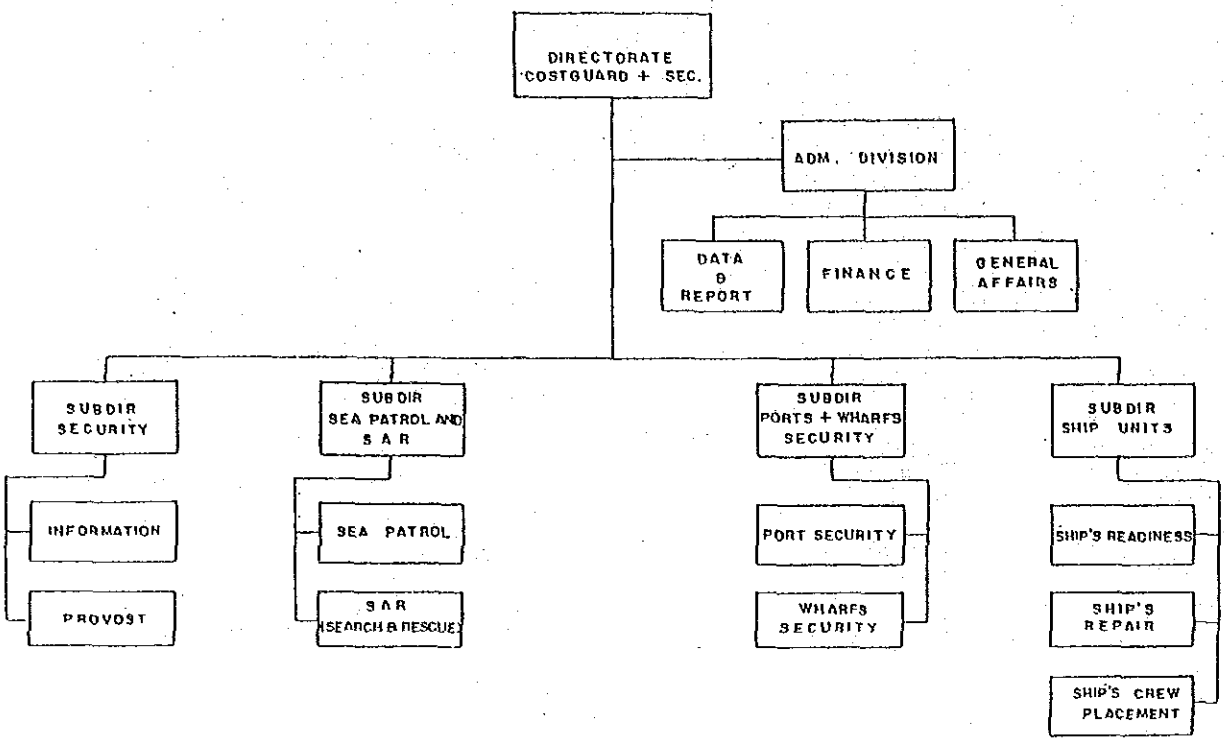


Fig. 10-1-10 Organization Chart of Directorate of Sea and Coast Guard, and Security

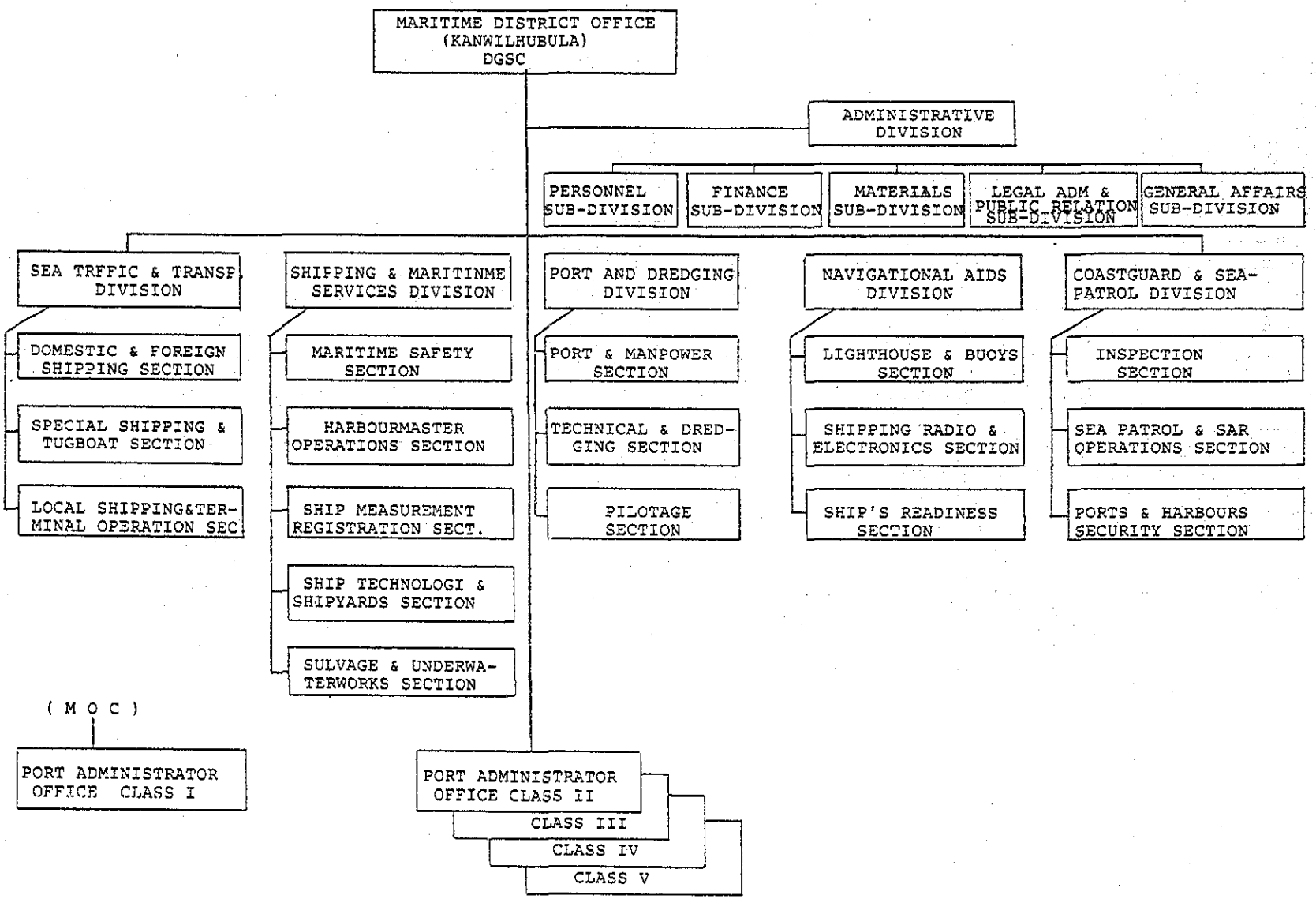


Fig. 10-1-11 Organization Chart of Maritime District Office (KANWIL)

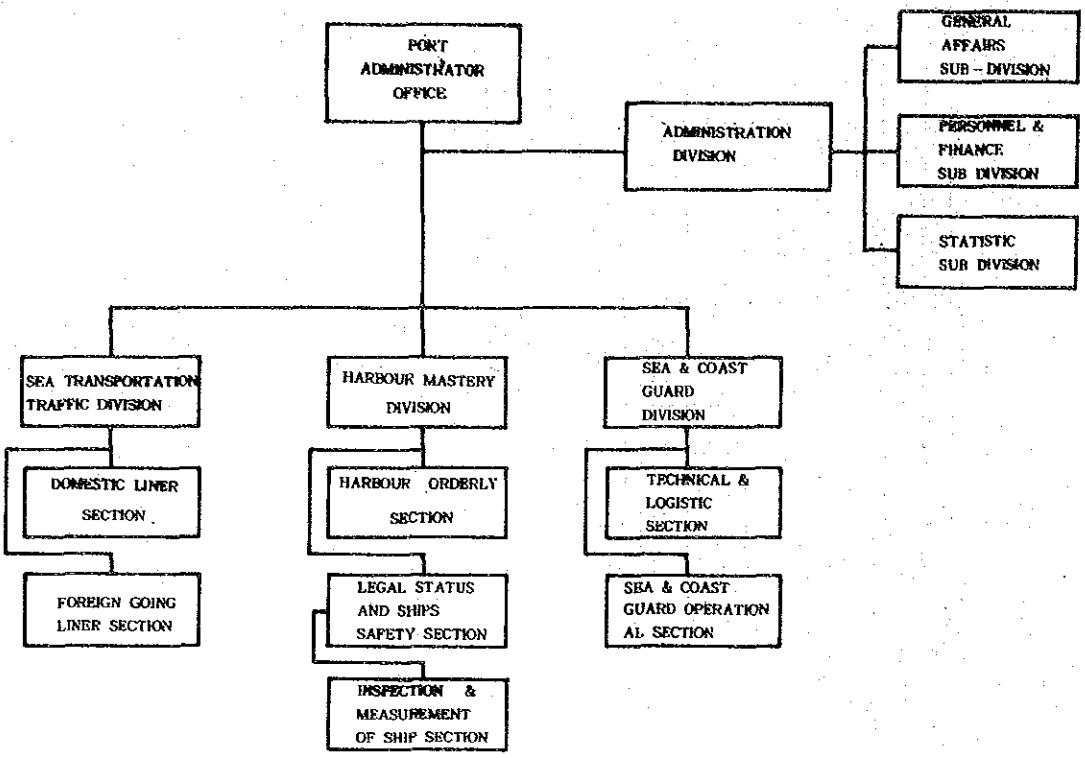


Fig. 10-1-12 Port Administrator Office Class I

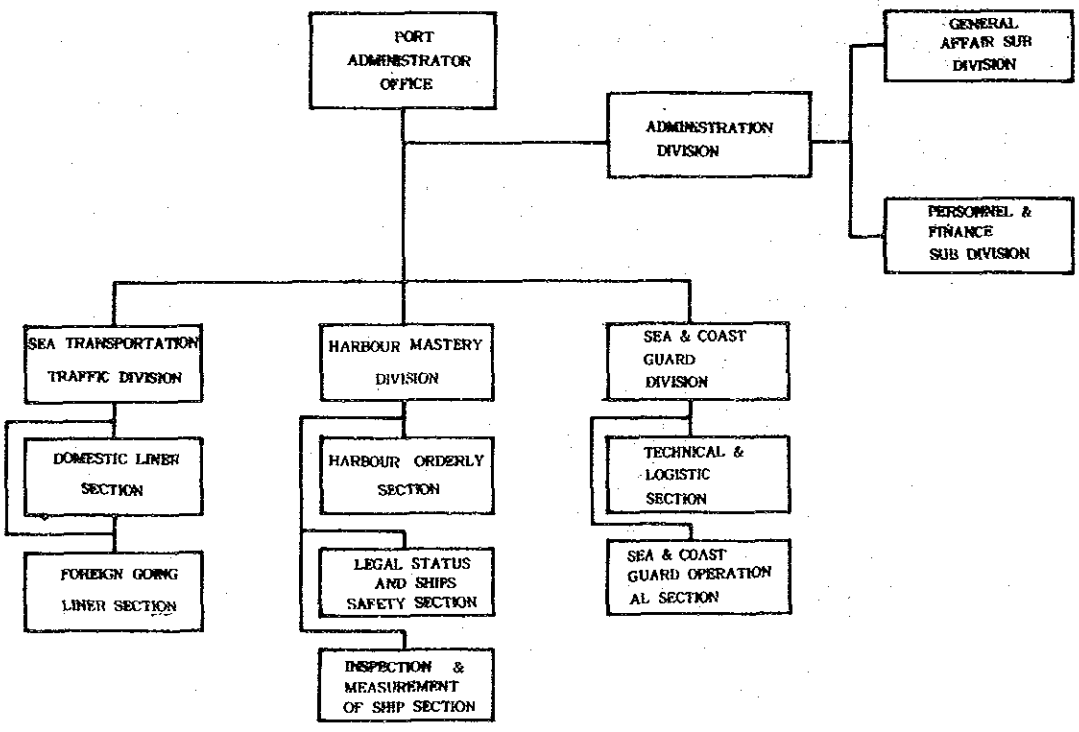


Fig. 10-1-13 Port Administrator Office Class II

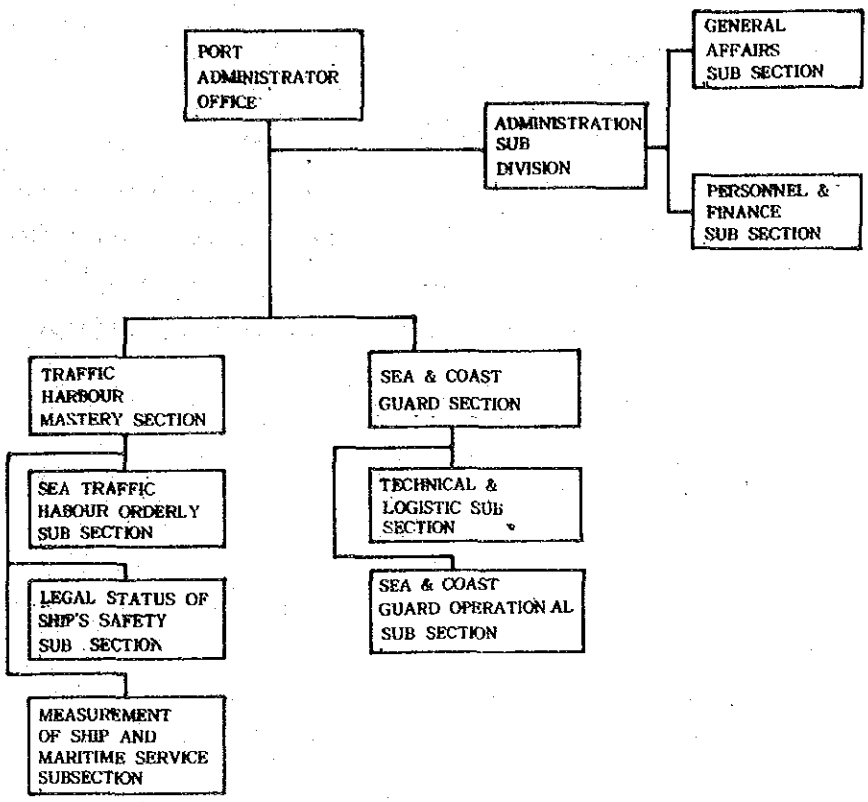


Fig. 10-1-14 Port Administrator Office Class III

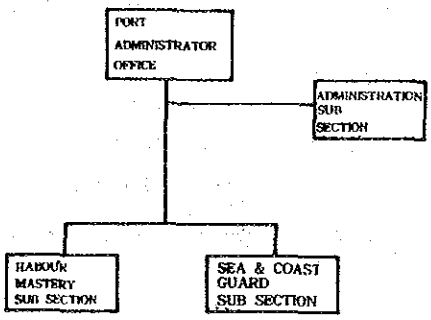


Fig. 10-1-15 Port Administrator Office Class IV

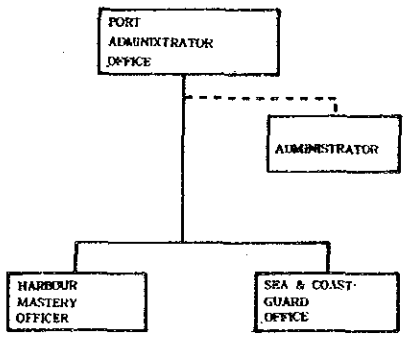


Fig. 10-1-16 Port Administrator Office Class V

(1) Directorate of Sea and Coast Guard

The main functions of this Directorate cover the security and safety aspects at sea and in the ports, and are to be operationally carried out mainly through KPLP operational units. The control functions of sea patrol and law enforcement at sea are based on the relevant laws and regulations. The Directorate comprises Administrative Division and the four Sub-Directorates as given below:

(i) Security
(ii) Sea patrol and SAR
(iii) Ports and wharf security
(iv) Ship units

The Organization chart of the Directorate of Sea and Coast Guard is shown in Fig. 10-1-10.

(2) Directorate of Navigation

The main functions of this Directorate are to plan and manage the aids to navigation and other navigational matters including communications for securing the navigation safety of ships in and around the country, and are to be operationally carried out through the 24 Districts of Navigation established.

The operational performance of the facilities are based on both international and national laws and regulations. The Directorate consists of Administrative Division and the five Sub-Directorates as given below:

(i) Navigational aids
(ii) Maritime electronics and telecommunications
(iii) State vessels
(iv) Ships engineering and repair
(v) Maritime occupational health

The organization chart of the Directorate of navigation is shown in Fig. 10-1-9.

(3) Directorate of Marine Safety

The main functions of this Directorate are to plan and control the maritime safety aspects at sea and in the ports as well as ships safety, and are to be operationally carried out mainly through Harbour Masters. The controlling functions of regulations, licenses and certificates are based on the relevant international and national laws and regulations in enforcement. The organizational structure of this Directorate comprises Administrative Division and the five Sub-Directorates as given below:

(i) Nautical, technical and radio inspection
(ii) Sea worthiness
(iii) Ships measurement
(iv) Harbour and ships crew
(v) Sea pollution

The organization chart of the Directorate of Marine Safety is shown in Fig. 10-1-7.

(4) Maritime District Office (KANWIL)

KANWILs are responsible for regional administration, operation and coordination of the operational local offices. There are the six Divisions established in each KANWIL as given below:

(i) Administrative
(ii) Sea traffic and transport
(iii) Shipping and maritime services
(iv) Ports and dredging
(v) Navigation aids
(vi) Coast guard and sea patrol

There are the local operational units of Port Administrators (ADPELs), Class III-V, to which Harbour Masters, Districts of Navigation (DISNAV) and Coast Guard and Sea Patrol (KPLP) Units belong.

The present situations show that some of the Heads of KPLP units and/or DISNAV have double assignment with the Heads of Coast Guard and Sea Patrol Division and/or of Navigation Aids Division of the relevant KANWILs.

The organization chart of the Maritime District Office is shown in Fig. 10-1-11.

(5) Port Administrator Office (ADPEL)

The Port Administrator offices (ADPELs) are classified into the two levels: ADPELs I Class, located at 1st Class Ports, are responsible to the Minister of Communications, and ADPELs II to V Classes, located at other classes of ports, are responsible to the Heads of KANWILs.

Port Administrator office has the duty to the Central Headquarters for the service activities within the working area of Port by means of smoothening sea transportation, more specifically;

(i) To prepare the operational working program of Harbour-wise service activities.

(ii) To carry out duties of harbour inspection, ship's safety, measurement and registry, as well as maritime services.

(iii) To maintain security and good order within the working areas of harbour, sea and coastal waters as well as giving SAR assistance.

(iv) To undertake the administration and household matters of Port Administrator Office.

The organizational structures of Port Administrator office are as follows:

Port Administrator office Class I comprises;

a. Administrator Division
b. Sea Transportation Traffic Division
c. Harbour Mastery Division
d. Sea and Coast Guard Division

Port Administrator office Class II comprises;

a. Administrator Division
b. Sea Transportation Traffic Division
c. Harbour Master Division
d. Sea and Coast Guard Division

Port Administrator office Class III comprises;

a. Administration Sub Division
b. Traffic Harbour Master Section
c. Sea and Coast Guard Section

Port Administrator office Class IV comprises;

a. Administration Sub Section
b. Harbour Master Sub Section
c. Sea and Coast Guard Section

Port Administrator office Class V comprises;

a. Administration officer
b. Harbour Master officer
c. Sea and Coast Guard officer

The organization charts of the Port Administrator office by class are shown in Fig. 10-1-12 to Fig. 10-1-16.

10.1.3.3 National SAR Agency (BASARNAS)

The National SAR Agency (BASARNAS) is immediately under the Indonesian SAR Board (BASARI), which is the highest body in the national SAR system, and has the authority to execute coordination for land, sea and SAR. Rescue Coordination Center (KKR) and Rescue Coordination Sub-Center (SKR) are within the BASARNAS hierarchy to execute the regional and local coordination.

Fig. 10-1-17 shows the organization chart of BASARNAS.

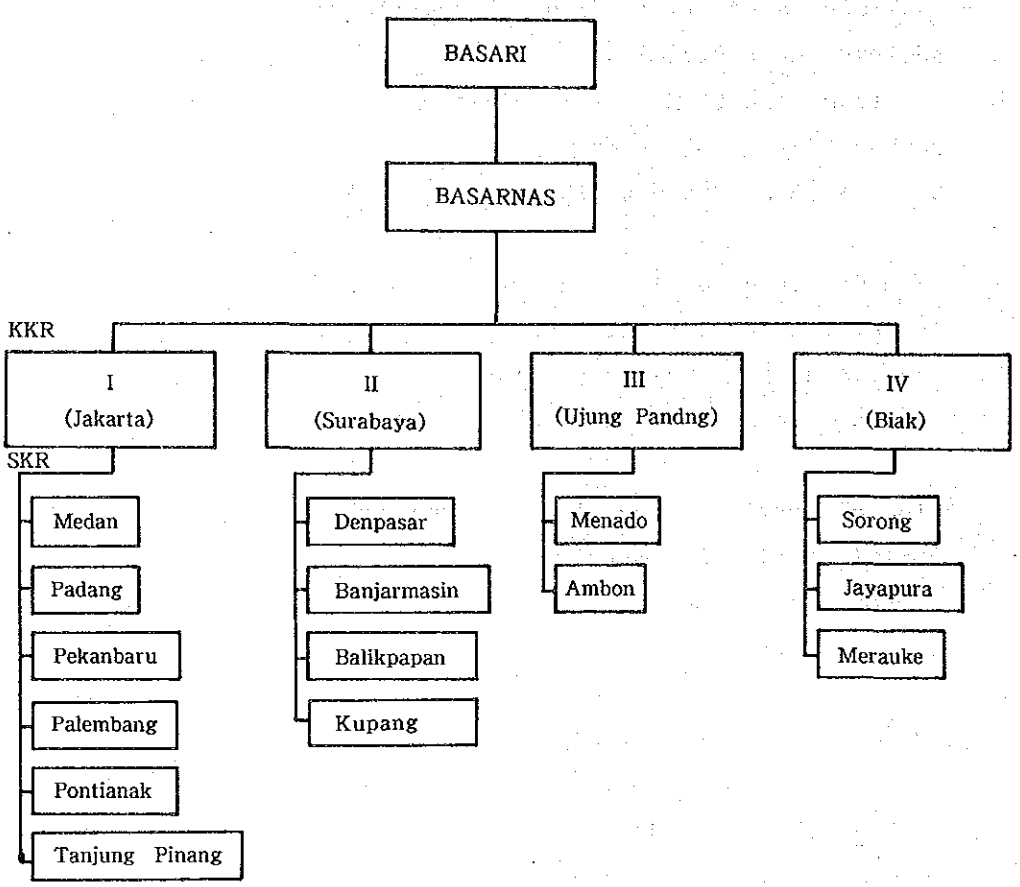


Fig. 10-1-17 Organization Chart of National SAR Agency (BASARNAS)

(1) Indonesian SAR Agency (BASARI)

The national SAR system is primarily attributed to BASARI, which coordinates the conduct of efforts for searching and giving assistance by utilizing resources such as personnel and materials from the Government and private institutions needed for SAR operations.

BASARI was established by Presidential Decree No. 11/1972. The Minister of Communications is appointed as the Chairman, and the members are the Minister of Defense and Security, the Minister of Foreign Affairs, the Minister of Internal Affairs, the Minister of Finance and the Minister of Social Affairs. BASARI consists of Chairman, BASARNAS, KKR, SKR and SAR units.

(2) BASARNAS

BASARNAS, the coordination execution body immediately under BASARI, is responsible for coordinating efforts and activities of searching and giving assistance for rescue in accordance with the relevant national and international SAR regulations. BASARNAS has the two levels of subordinates in local organization as given below.

(3) Rescue Coordination Center (KKR)

KKR has the responsibility of organizing apparatuses of rescue coordination by means of coordinating all SAR potentials and facilities needed for further action within its responsible areas. There are 4 KKRs established respectively in Jakarta, Surabaya, Ujung Pandang and Biak.

(4) Rescue Coordination Sub-Center (SKR)

SKR is responsible for coordinating and directing the utilization of manpower and materials in its working area. There are 15 SKRs established in all in each KKR region.

The Headquarters of BASARNAS is located in Jakarta while the Rescue Coordination Centres are spread out in 4 areas:

Area I : in Jakarta covering Rescue Sub-centres in Medan, Pandang, Pakanbaru, Palembang, Tanjung Pinang and Pontianak.

Area II : in Surabaya covering Rescue sub-centres in Denpasar, Banjarmasin, Balikpapan and Kupang.

Area III : in Ujung Pandang covering Rescue Subcentre in Ambon and Manado.

Area IV : in Biak covering Rescue Sub-centre in Jayapura, Sorong and Merauke.

10.1.3.4 Regional SAR Coordination Forum (FKSD)

Establishment of FKSD has recently been in progress throughout the nation based on the instructions by the Minister of Communications for the purpose of improving the efficiency of SAR coordination through establishment of the Regional Center for rescue coordination in the relevant regions concerning SAR operational activities.

FKSD is in charge of area coordination specifically for the relevant Province under the control of Governor, while BASARNAS is in charge of coordination of all SAR activities in Indonesia.
motivation to establish FKSD is as follows:

- They want to improve capability of SAR in each Province.
- Governor in his Province has the highest authority and with its authority coordination is to be carried out more easily.

In view only of improving the coordination, as stated above there are no conflicts between BASARNAS and FKSD, but the area efficiency.

Feature of handling SAR problems is mostly sectorial oriented, and therefore necessity exists to establish a simple organization that can be comprehended by all SAR involved parties in a region.

The organization structure is given in Fig. 10-1-18, and the present situations of issuance of Governor's Decrees concerning the establishment of FKSD are shown in Table 10-1-1.

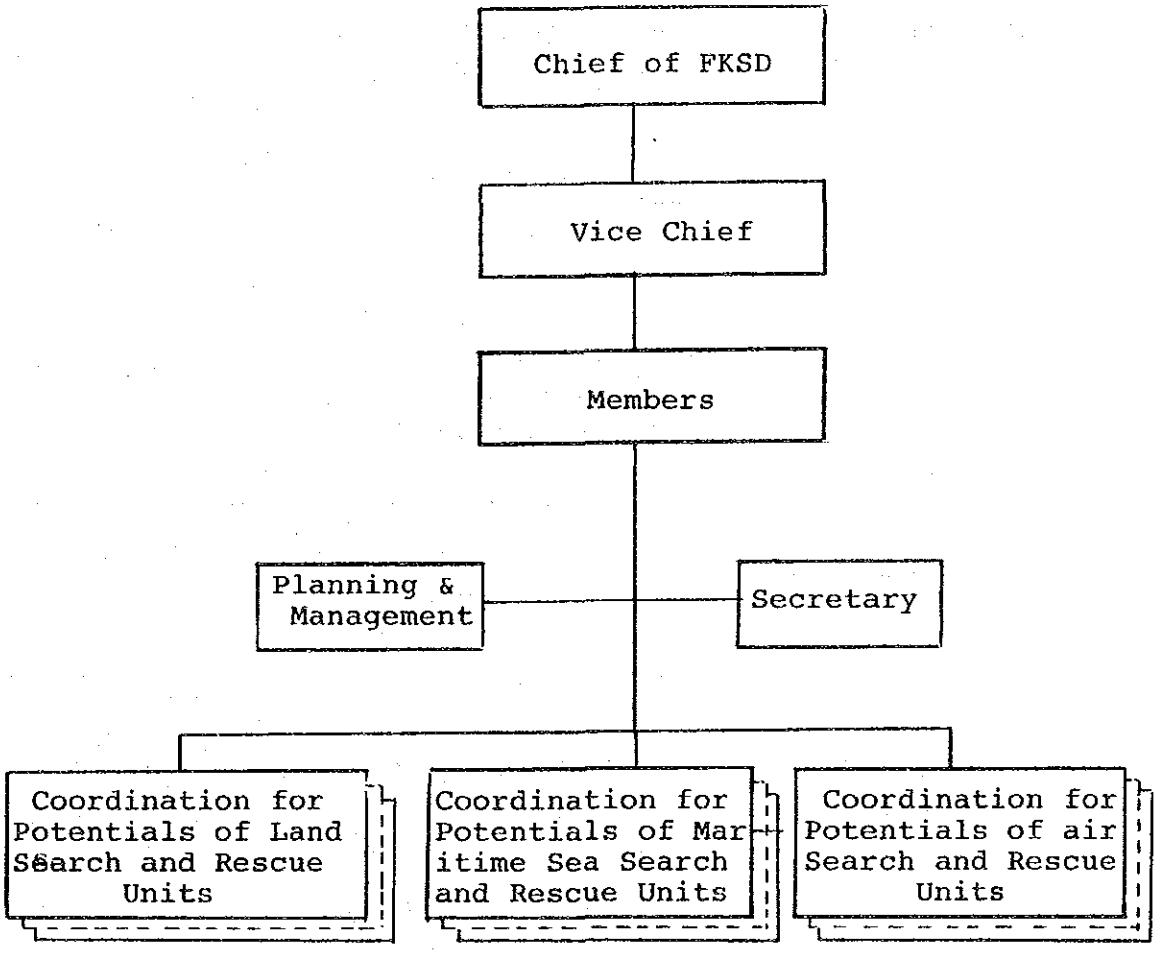


Fig. 10-1-18 Organization Chart of FKSD
(Local SAR Coordination Forum)

Table 10-1-1 Present Situations of Issuance of Governor's Decree to Establish FKSD (As of Nov. 1987)

KANWIL	area	Issued	In Process
I	Medan		Yes
II	Dumai	May. 5, 1987 No. KPTS 202V/1987	
III	Tg. Priok		Yes
IV	Surabaya		Yes
V	Banjarmasin	Mar. 1987 No. 089/1987	
VI	Ujung Pandang		Yes
VII	Manado	Feb. 4, 1987 No. 41/1987	
VIII	Ambon	Aug. 21, 1987 No. 370/SK/782/1987	
IX	Jayapura		Yes

10.1.3.5 Public Corporations

(1) Public Port Corporation (Perumpel)

The Public Port Corporation is the state owned enterprise under the umbrella of the Minister of Communications.

To perform the missions, the Public Port Corporation has the following main functions:

- To manage the services of facilities and equipment in port, pilotage, towing, mooring and terminal
- To provide and maintain the facilities and equipment in port
- To manage the financial matters and so on.

(2) Public Dredging Corporation (Perumpen)

The Public Dredging Corporation is the state owned enterprise under the umbrella of the Minister of Communications. The operational administration comprises the Western Region as its main base in Tg. Priok and the Eastern Region as its main base in Tg. Perak. The activities performed by the Corporation are:

- Dredging for maintenance and construction of sailing channels and harbour basin
- Land reclamation or land fill
- Research on and supervision of dredging and reclamation

and so on.

The Public Dredging Corporation operations the dredging fleet such as hopper suction dredgers, cutter suction dredgers, etc., and the supporting equipment lide fuel barges, crew barges and so on.

10.1.4 Manpower

The personnel who engage in the maritime safety services carry out the multifunctional work of special expertise under the severe environment conditions prevailing at sea. In addition, the world wide movement seen in new international order of ocean requires the maritime safety personnel, the international sense of speciality, and also the wide knowledge on the speciality as well as spiritual and physical strength are essential factors to be required for the maritime safety personnel. View is made from the above standpoint on the present status of maritime safety personnel of DGSC referring to the classifications by education, age and certificates which are described in Fig. 10-1-19 to Fig. 10-1-21.

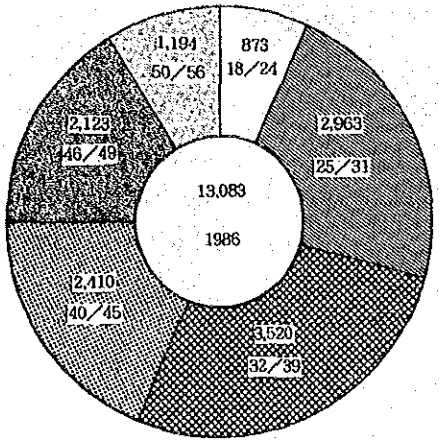


Fig. 10-1-19 DGSC Personnel by Age

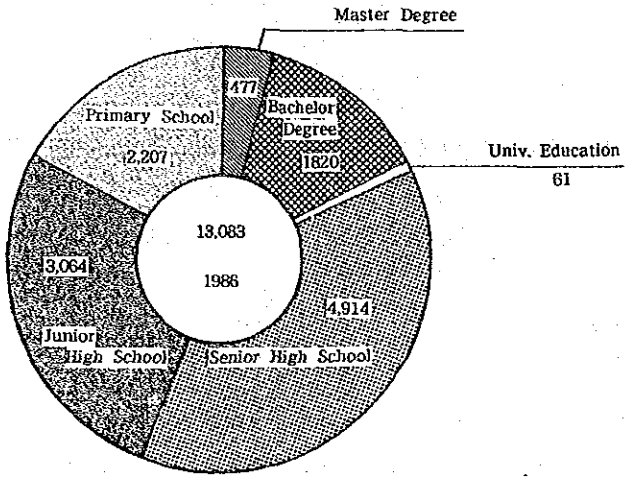


Fig. 10-1-20 DGSC Personnel by Education

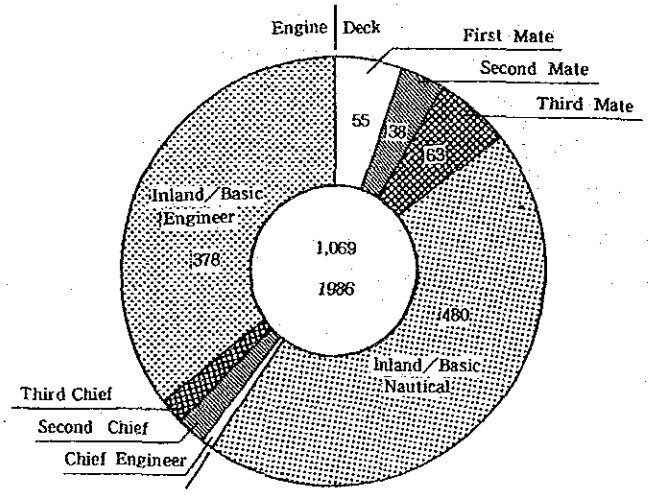


Fig. 10-1-21 DGSC Personnel by Certificates

Table 10-1-2 Number of DGSC Personnel and Three Directorates of SEa & Coast Guard, Navigation and Marine Safety

	Total	3 Directorate
DGSC	1,528	794
I	1,182	846
II	1,298	1,126
III	2,964	2,859
IV	1,818	1,288
V	1,091	708
VI	696	588
VII	848	685
VIII	612	529
IX	1,016	802
Total	13,083	10,225
		78%

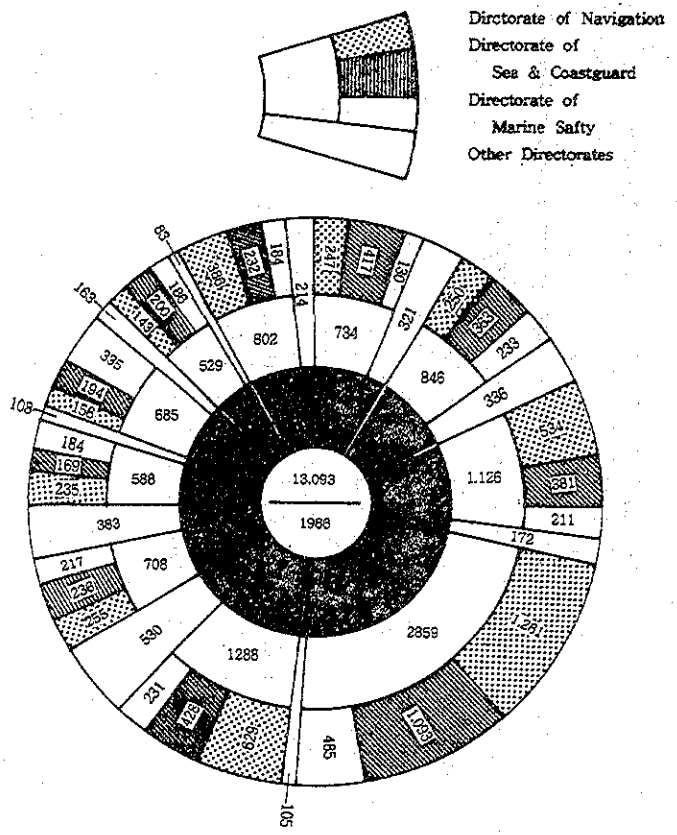


Fig. 10-1-22 The Situation of Personnel Working for DGSC

As seen in the above Figures,

(1) Difficulty is seen in recruiting key staff in DGSC manpower hierarchy.

(2) The highest percentage is occupied in age composition by the age group of 32-39, who will be nearing their retirement after a decade. Younger generation to follow is in shortage.

(3) The technical staff is in shortage.

Especially in the assignment of crew on board the patrol ships, they are ranked in the same category as the merchant ships having limited expertise features of maritime safety and SAR.

The total number of personnel working for the three maritime safety related Directorates dominates the DGSC population reaching 78% of the whole personnel. This situation is shown in Table 10-1-2 and graphed in Fig. 10-1-22.

The maritime safety services require the double knowledge on maritime safety administration and the field execution integrated; one does not work without the other. Therefore, the routine transfer of personnel between on-land and at sea is a necessary means to be followed. The present status o maritime safety services being carried out by DGSC shows that primary services are in and around greater port areas and maritime SAR activities are to be faced whenever necessary. The manpower allocation to each KANWIL Is reasonably made generally through routine transfer of personnel.

10.2 Analysis

10.2.1 Maritime Safety and SAR System in Maritime Nations

The maritime safety systems currently adopted in other maritime nations in the world may generally be divided into the two categories of multi-functional single organization and single-functional multi-organizations.

The maritime safety and SAR in other nations may be summarized in general as shown below.

Since the individual nations have introduced their own systems appropriate and suitable for their own, it may not be possible to conclude which one should be more useful and advantageous as compared to the other. It will, however, be useful to make studies on the maritime safety systems currently implemented in order to refer to the maritime safety and SAR system for Indonesia.

10.2.1.1 Multi-functional Single Organization System

(1) United States Coast Guard (USCG)

The United States Coast Guard is now organizationally under the Department of Transportation (DOT), after undergoing many changes originally grew from "Revenue Marine" in 1790 to the Coast Guard in 1915 then to the current role as an manager of the dual role mission. The strategic dual role of USCG comprises (a) the primary federal agency of the United States enforcing maritime laws and regulations, ensuring maritime safety, and thus facilitating maritime transportation in time of peace (b) the navy in time of war or national emergency. The missions of USCG are categorized as follows:

(i) Operational missions

The operational missions are carried out principally by the operational units under the command of the District Commanders mobilizing their task forces of ships and aircraft. The operational missions of USCG include:

- Search and rescue (SAR)
- Enforcement of law and treaties
- Marine environmental protection
- Port safety and security
- Aids to navigation
- Radio navigation aids

- Commercial vessel safety
- Recreational boating safety
- Military operations/preparedness

For the effective execution of such missions, the three Divisions of Operations, Marine Safety and Boating Safety are established in each District Office.

(ii) Support missions

The support missions are primarily under the responsibilities of the Headquarters and its units. The support missions include:

- Communication services support
- Public and international affairs
- Engineering support
- Legal support
- Research and development
- Medical support

The main role of the Area Offices is to coordinate the specific functions involving two or more District Offices such as law enforcement patrol, area communications and so on.

The organization chart for USCG is shown in Fig. 10-2-1.

In summary, USCG assumes the sole responsibility for the maritime safety and SAR in the U.S.

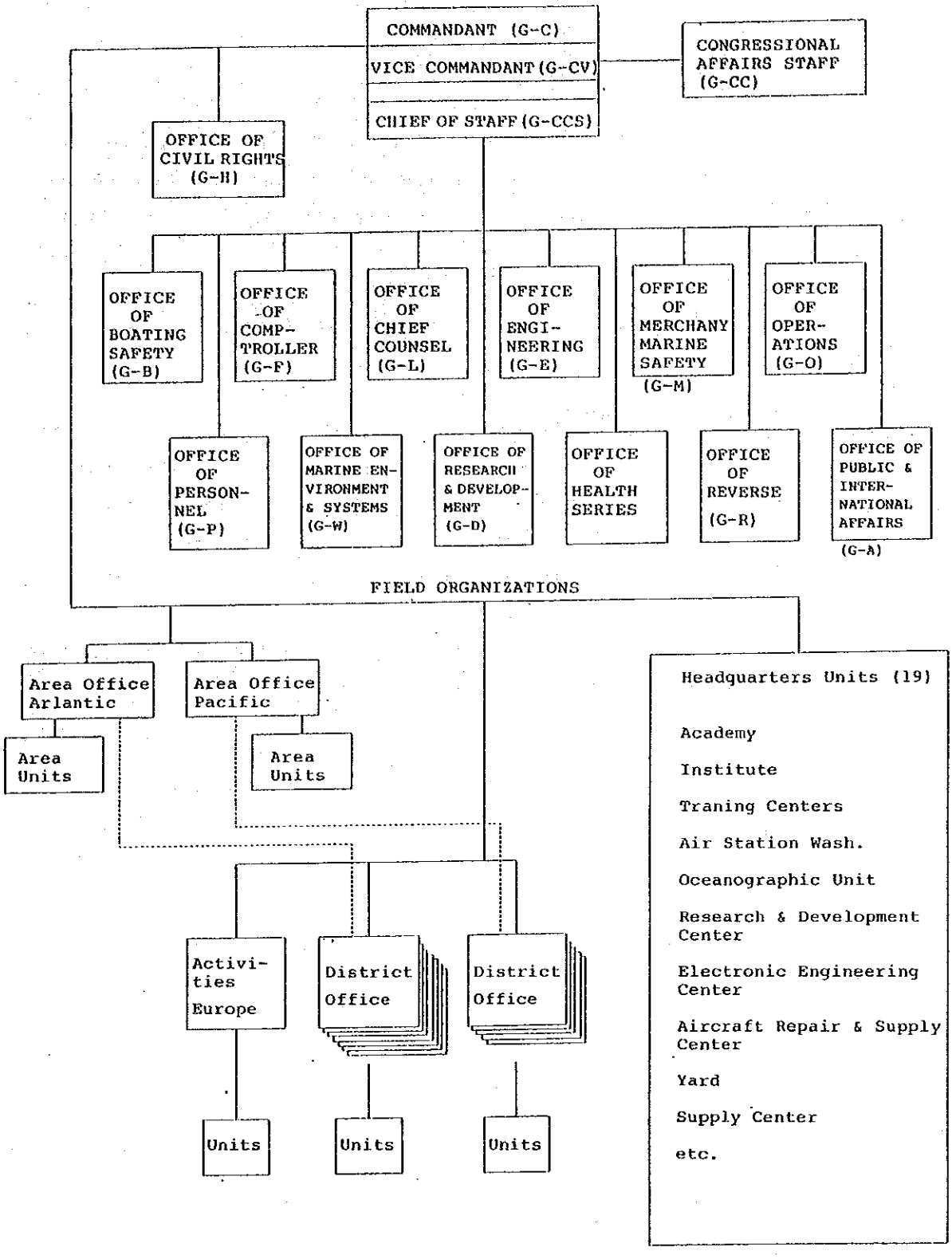


Fig. 10-2-1 Organization Chart for USCG, 1981

(2) Maritime safety agency of Japan

Maritime Safety Agency in Japan was established in 1948 for the purpose of protecting life and preventing, detecting and suppressing violation of law at sea as an external organ under the jurisdiction of the Minister of Transport.

Since then, the Agency has grown in its organization, capacity and performances.

The services provided by MSA are divided into the three sectors, which are the Guard and Rescue services, the Hydrographic services and the Aids to Navigation services. The Guard and Rescue services cover law enforcement at sea, prevention of maritime disaster, search and rescue operations, maritime traffic safety and marine environment protection.

As in the case of USCG, the missions of Japanese Maritime Safety Agency are generally categorized as those for the operational and support as given below:

Operational missions: -
- Search and rescue
- Maritime law enforcement
- Maritime environment protection
- Safety of maritime traffic
- Aids to navigation

Support missions: -
- Communications services
- Engineering support
- Legal support
- Personnel support
- Research and development
- International affairs

The operational missions are primarily carried out by the field operational units under the administrative authority of the Regional Headquarters through a chain of command/control of the Central Headquarters. The support central missions are executed by the Central Headquarters.
The organization chart of MSA is shown in Fig. 10-2-2.

In summary, the Maritime Safety Agency has the sole responsibility for the maritime safety and SAR.

(3) Philippine Coast Guard (PCG)

The Philippine Coast Guard, one of the major units of the Philippine Navy, is responsible for the maritime SAR as well as for the operational maritime safety including aids to navigation.

The Philippine Coast Guard has the eight districts geographically divided, and each district is further divided into the stations, sub-stations and detachments.

The Maritime Disaster Response Center (MDRC) is organized at the Headquarters of Philippine Coast Guard under the cognizance of the Coast Guard Operation Center (CGOC) to monitor distress signals; receive reports pertaining to maritime disasters; and take care of plans, basic strategies and other related matters pertaining to SAR and policies.

There are eight (8) District Marine Disaster Responses (DMDRC) located throughout the Philippines which serve as counterparts of MDRC at the district level.

There are 39 Station Maritime Disaster Response Centers (SMDRC) at the station level.

Maritime Disaster Response Teams (MDRT) are created at the District and Station levels and whose members are especially trained and equipped to provide immediate response to maritime disasters.

The organization chart is shown in Fig. 10-2-3.

In summary, the role of maritime safety and SAR missions in the Philippines is assumed by the single organization. Note is made that the re-organization has been underway in the Philippine Government and the PCG will likely to be under the umbrella of the Ministry of Transport.

10.2.1.2 Single Functional Multi-organizations System

(1) Maritime Safety and SAR in the U.K.

The maritime safety and SAR in the U.K. are implemented through joint operations by the relevant organizations like other countries in Europe.

The Coast Guard, under the Department of Trade and Shipping, is responsible for the safety of life at sea and the coordination for SAR activities. There are eleven Districts and additional District in Dover. The eleven Districts have individual sub Districts and the Dover District is responsible for the traffic control system. These on-shore establishments carry out the round clock surveillance. However, the Coast Guard has no own mobile task forces, but mobilizes chartered airplanes.

The Royal Navy's aircraft are to be also mobilized upon request.

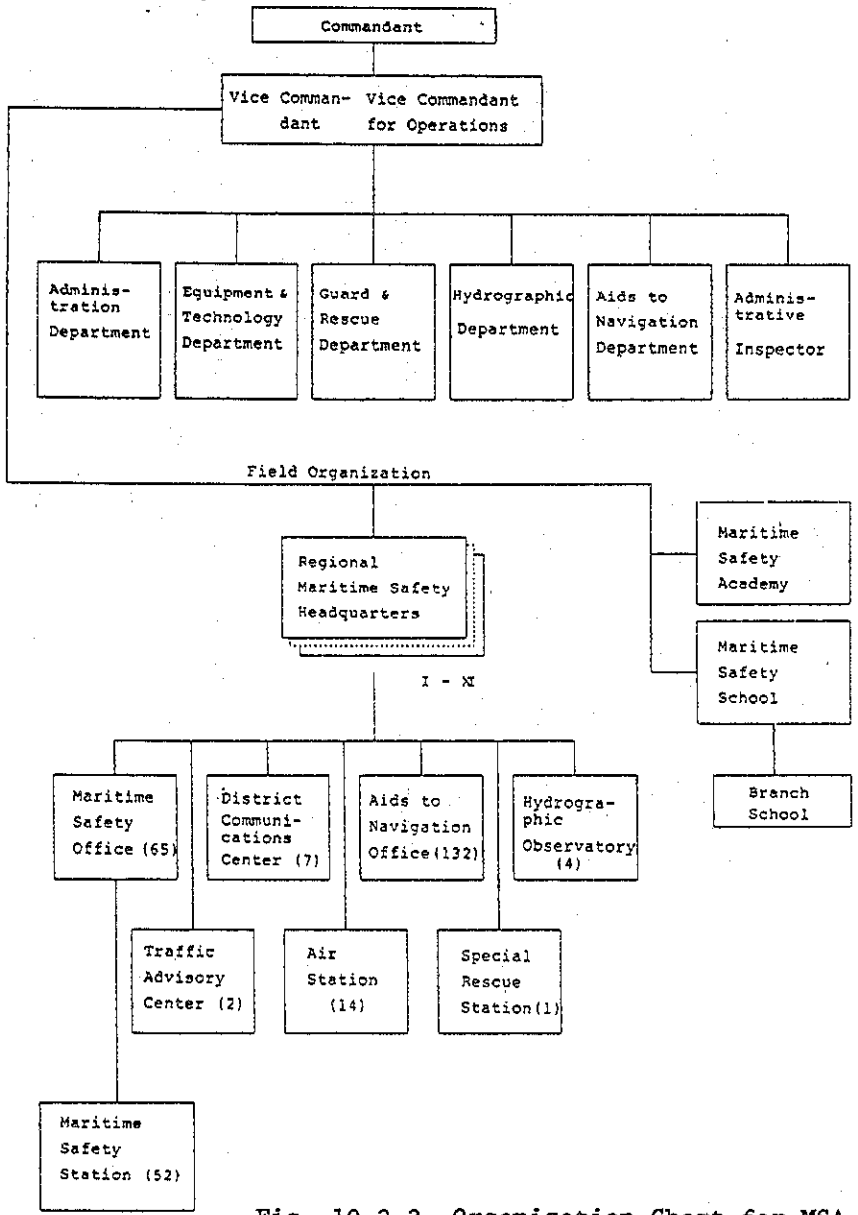


Fig. 10-2-2 Organization Chart for MSA Japan

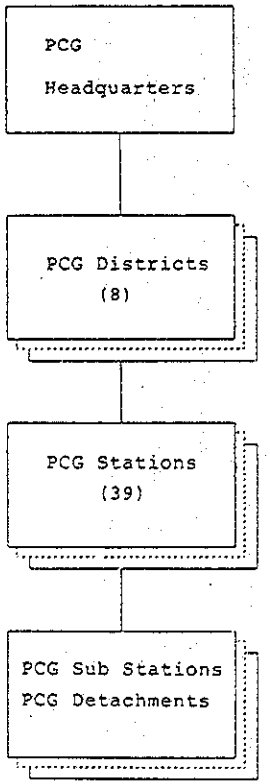


Fig. 10-2-3
Organization Chart of Philippine Coast Guard (PCG)

The Royal Lifeboat Institute plays an extremely important role in maritime SAR. It has about 260 small to large lifeboats strategically allocated nation wide. The range-wide operations by the Institute's lifeboats are four hours reach and 30 miles in distance from the rescue centers. The Institute is a charity and volunteer organization dealing recently with about 3.5 thousands accidents per year, and saved approximately 1,300 lives. The maritime SAR activities are also to be supported by the Water Police and Customs.

On the other hand, other services executed by USCG or MSA such as aids to navigation, hydrographic services are carried out by other relevant organizations.

In summary, the role of maritime safety and SAR missions in the U.K. is assumed by the multi-organizations.

(2) Maritime Safety and SAR in the Netherlands

The maritime safety and SAR system similar to that currently applied in the UK had been executed until very recently.

The Netherlands Government took a number of decisions in concerning the conduct of government operations in the North Sea, in the spring of 1986, among them to create the new body of Coast Guard.

The Netherlands Coast Guard (NCG) was inaugurated only on February, 1987.

(i) Organizational Composition of NCG

NCG consists of a cooperative framework comprising the central government departments concerned which retaining their own duties and responsibilities of all participating services.

The bodies involved in the various services under the umbrella of NCG are:

a. Directorate General Shipping and Maritime Affairs (DGSM)
b. Coastal radio station, part of the Nethrland PTT
c. Royal Netherlands Navy
d. National Police
e. Private organizations for SAR
f. Public works Department (DGPW)
g. Customs
h. General Inspection and Investigation Service (A.I.D), Ministry of Agriculture and Fisheries

(ii) Operational System of NCG

NCG Center is located in the Scheveningen Radio building functioning to provide information and advice and acting as a coordination center. There are always two coordinators stationed; one responsible for maritime service and the other for law enforcement operations. The Center staff of about 20 people will be provided by the participating services.

(iii) Prime Responsibilities of Participating Services

The prime responsibilities of participating services are summarized in Table 10-2-1.

Table 10-2-1 Prime Responsibilities of Participating Services

Operation	Duties	Responsibility by
Maritime Service Operations	Maritime traffic (In port area) (Outside approach route)	DGSM (Port Authority) (NCG)
	Aids to navigation (Outside approach routes)	DGSM (NCG)
	Distress, safety and emergency messages, etc.	NCG
	SAR	NCG
	RCC	Navy
	Operation	National Police
	Anti-pollution	NCG
	Reporting	DGSM
	Operation	DGPW
	Port area	Port Authority
Law Enforcement	General surveillance	NCG
	Fishing	National Police
	Environment	Customs
	Shipping	AID
	Water Sports	Navy
	Recreation	DGSM
	Customs regulations	DGPW

(iv) Resources of NCG

NCG has no resources.
The vessels and aircraft for the maritime safety and SAR activities are to be made available or called upon to provide the services from North Sea organization, Navy, National Police, AID and private search and rescue organizations and coastal rescue teams.

NCG as an interdepartmental organization will be supervised by the Coast Guard Supervisory Committee.

In summary, the role of NCG is to liase with all the interested parties and SAR potentials in the Netherlands. In this aspect, NCG can be said as a kind of maritime version of Indonesian BASARNAS.

10.2.1.3 System Suitability

The single body viewpoints, i.e. by the multi-functional single organization system, may present that the maritime safety and SAR require very professional nature and highly specialized double qualifications of maritime law enforcer and rescuer, and accordingly that efficient and effective performance of the operations in a consolidated discipline will be pursued in a single body.

The multiple body viewpoints, i.e. by the single functional multi-organization system, may present that coordinative cooperations and operations will be lacked and from time to time face bureaucratic frictions in the operations, and accordingly that the development of integrated operations in a unified discipline needs to be wisely adjusted.

Discussions may rise as to which one of the above two systems will be more suitable than the other for Indonesia.