2.3 Marine Accidents

(1) Occurrence of Marine Accidents by Type of Ship

According to the DGSC log books from 1982 to 1986, the total number of marine accidents which occurred during these five years was 1,781, and the cause of marine accidents was in order of 'sunk', 'collision' and 'stranding'. The number of accidents by these three causes was 984, occupying the majority of the total.

By category of ship, accidents happened in order of motorized sailing vessels, motor ships and cargo ships.

The total number of marine accidents involving fishing boats during these five years was 142.

(2) Occurrence of Marine Accidents by Tonnage

As for the occurrence of marine accidents by tonnage from 1982 to 1986, the number of accidents by 100 G/T or less was 702, which was the highest. The number of accidents by 100 to 500 G/T was 693. Marine accidents by 500 G/T or less accounted for 78.3% of the total.

(3) Distribution of Marine Accidents

The marine accident-prone areas include the north coast of Jawa Island centering on the Jawa Sea, the sea area from around Jakarta Port to the Strait of Sunda, Surabaya (Tg.Perak) Port and its environs, west Sumatra Island and Bangka Island, the Strait of Singapore and environs, Belawan Port and environs, east and south coasts of Kalimantan Island, and Ujung Pandang Port and environs. The tendency of marine accidents each year is nearly the same.

(4) Marine Accidents Involving Death and Missing Persons

The number of marine accidents involving death and missing persons during the past five years (1982-86), which resulted from collision, stranding, flooding and capsizing, was 231, accounting for 13% of all accidents.

The number of death and missing persons during the same period was 804. Death and missing persons caused by sinking and capsizing were conspicuous among them.

(5) Human Accidents, etc.

The term 'human accidents' means death or injuries resulting from falling into the sea, missing persons and accidents inside of ships.

The number of human accidents during the past five years was 201. The number of such accidents by 500 G/T or less small ships was 155, accounting for 77.1% of the total.

The characteristic of human accidents is that human accidents by fishing boats accounted for 25% of the total human accidents, although accidents by fishing boats occupied only 8% of the total number of marine accidents.

The number of marine accidents caused by fishing boats and motor ships has tended to increase during the past five years (in particular, this number sharply increased between 1985 to 1986).

The human accident-prone areas include Belawan Port and environs, the Strait of Singapore, the south coast of Bangka Island, Jakarta Port (Tg.Priok) and environs, the north coast of Jawa Island, Surabaya Port, the central area of the Jawa Sea, and the east coast of Kalimantan Island.

Table 2.3.1 Number of Marine Accidents by Kind and by Category of Ships (1982-86)

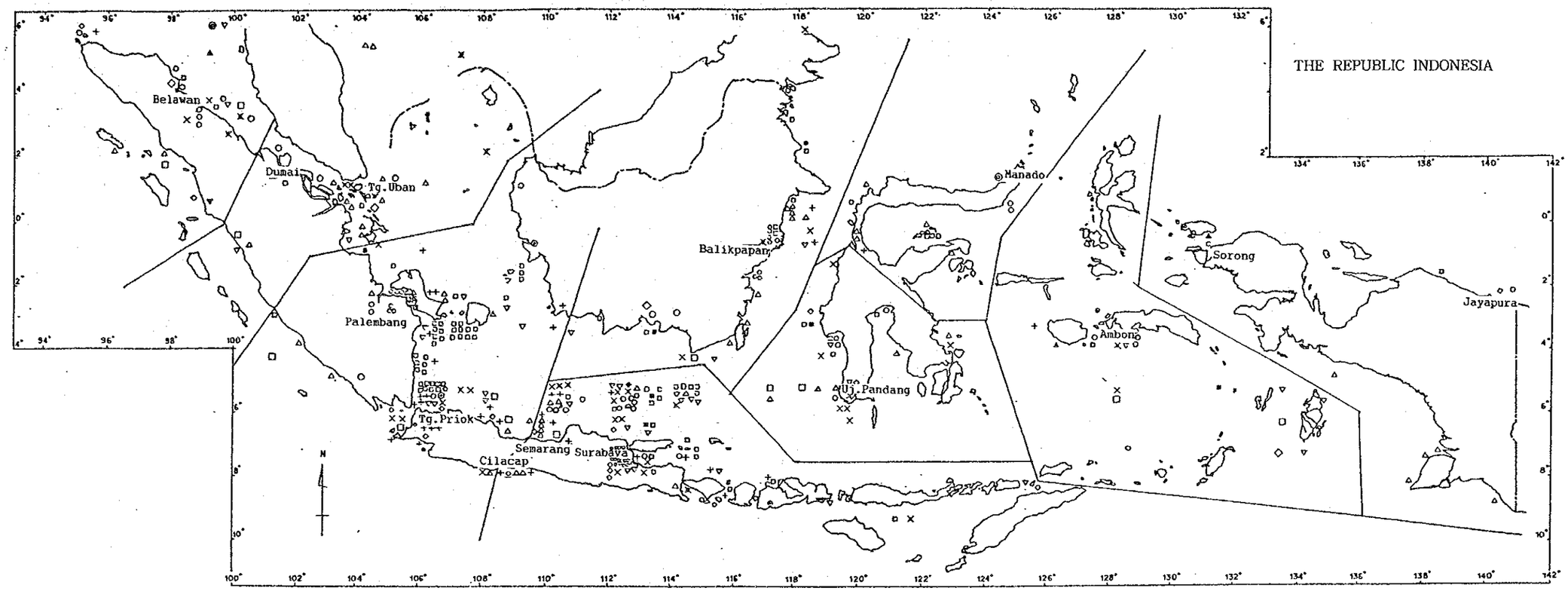
Kind \ Type	Cargo	Tanker	Passenger Ship	Tug Boat	Barge	Fishing Vessel	Pleasure Boat	Motor Ship	Motorized Sailing Ship	Sailing Ship	Unknown Others	Total
Collision	74	22	5	28	5	19	4	71	21		17	266
Stranding	49	15	3	10	6	15		60	51	1	16	226
Capsized	7			5	2	2	2	13	8	1	1	41
Fire	18	3		6		4	2	32	31		5	101
Flooding	19	3	3	4	3	6	1	27	59		4	129
Sunk	56	2	2	10	9	26	2	103	265	2	15	492
Engine Propeller Rudder Trouble	38	17	6	41	1	15	3	49	38		15	223
Drifting	15	1		3	4	2		8	12		2	47
Human Loss-Injury	40	3	4	9	3	50	1	42	33	2	14	201
Others Unknown	12	1		8	2	3		17	6	1	5	55
Total	328	67	23	124	35	142	15	422	524	7	94	1,781

Source: DGSC Log Book

Table 2.3.2 Number of Marine Accidents by Kind and by Size of Ships (1982-86)

Kind \ Tonnage	0 ~ 100	100 ~ 500	500 ~ 1,000	1,000 ~ 3,000	3,000 ~ 10,000	10,000 ~ 20,000	20,000 ~	Unknown Others	Total
Collision	80	65	34	47	28	6		6	266
Stranding	60	91	21	31	15	5		3	226
Capsized	24	10	1	3				3	41
Fire	37	43	8	3	5	2		3	101
Flooding	44	64	7	3	7			4	129
Sunk	232	243	6	3	1			7	492
Engine Propeller Rudder Trouble	81	88	31	12	6	2		3	223
Drifting	21	20	2	1	2			1	47
Human Loss-Injury	102	53	11	12	18	2	1	2	201
Others-Unknown	21	16	6	4	8				55
Total	702	693	127	119	90	17	1	32	1,781

Source: DGSC Log Book



Legend :

○ Collision	● Collision
△ Stranding	▲ Stranding
□ Sunk	■ Sunk
◇ Fire	◆ Fire
▽ Flooding	▼ Flooding
◎ Capsized	◉ Capsized
× Human Loss-Inury	
+ Other	

(Accidents involed human loss and missing)

Fig. 2.3.1 Area Distribution of Marine Accidents Occurred in 1982

Section 3 Long-term Development Plan

3.1 Search and Rescue System

Maritime search and rescue (SAR) activities in Indonesia are performed under the coordinating umbrella of the National SAR Agency (BASARNAS).

The coordination functions of the national SAR system are conducted on a central level by BASARNAS, at the level of Directorate General, Head of Staff, and on a regional level by Rescue Coordination Center (KKR) and Rescue Coordination Sub-Center (SKR) which are subordinate bodies of BASARNAS.

The DGSC is responsible for the execution of maritime safety and SAR activities where SAR operations are under the coordination of BASARNAS, and more specifically the Directorate of Sea and Coast Guard (KPLP) carries out maritime safety and SAR tasks through its operation units. The Directorates of Navigation and Marine Safety provide support for the KPLP operations through their operation units of Districts of Navigation and Harbour Masters.

(1) Maritime Safety Rescue Ships

(i) At present, there are 123 maritime safety rescue ships in Indonesia, of which breakdown is as follows:

Table 3.1.1 Number of Maritime Safety Rescue Ships by Class

Class	Number of Ships	Length (m)	Operation Area
I	0	45 or over	Open sea
II	9	35 - 45	Open sea
III	16	20 - 35	Coastal waters
IV	35	10 - 20	Harbour and limited waters
V	65	5 - 10	Harbour and limited waters

(ii) Class III to V rescue ships belong to KPLP units, while Class II rescue ships belong to KPLP Fleet situated in Jakarta (Tg.Priok). Out of them, seven to eight ships are generally attached one each to the respective KANWILs for about three months at one KANWIL and then rotated from one to the other in the same rotation.

(iii) The operational performances and capacity of those ships are very limited due to aging except those of Class II which are not obsolete, and some of the ships seem not to have sufficient capabilities for normal operations and to have been kept in a favorable condition through skillful maintenance. Under such conditions, execution of proper activities for maritime safety patrol and SAR can hardly be attained.

(iv) The optimum allocation of maritime safety rescue ships is shown in Table 3.1.4. This allocation was decided considering 1) the analysis of both the distribution of the occurrence probability of accidents and the rescue efficiency, 2) the following points:

- Class I
  - . To cover the areas out of the reach of shore-based helicopters
  - . To cover the ocean areas for international SAR
  - . To supplement the gap areas operationally created by the coverage of Class II ships

- Class II
  - . Volume of multi-purpose services, being fully prepared to be always ready to move, types and numbers of ships allocated at present, number of personnel and relevant neighboring stations, and so on.

- Class III
  - . Port scale, marine accidents and other factors

(v) The improvement of maritime safety rescue ships is planned below:

Table 3.1.2 Improvement Plan of Maritime Safety Rescue Ships

Class	Total No. Required (A)	Existing No. (B)	Balance (A)-(B)	Scrapping by 2005	Balance to be improved & replaced
I-A	6	0	6	0	6
I-B	5	0	5	0	5
II	21	9	12	0	12
III	33	16	17	5	22
IV	37	33	4	0	4
V	62	65	Δ3	3	-
Total	164	123	41	8	49

Table 3.1.3 Particulars of Maritime Safety Rescue Ships by Class

Particulars	Class				
	I-A	I-B	II	III	IV
Operation area	All sea area	All sea area	All sea area	Coastal sea area	Coastal sea area
Cruising range	5,000 NM	3,000 NM	520 NM	350 NM	200 NM
Length	74 m	59 m	35 m	24 m	18 m
Width	10 m	8 m	6.3 m	6 m	4.3 m
Depth	5 m	4.5 m	3.4 m	2.85 m	2.3 m
Gross tonnage	1,000 ton	500 ton	100 ton	93 ton	37 ton
Main engine	1,500 PSx2	1,300 PSx2	2,400 PSx2	540 PSx2	450 PSx2
Speed	15 KT	15 KT	26 KT	16 KT	21 KT
Others					
. Anti-rolling tank	Equipped	-	-	-	-
. Heliport	Equipped	-	-	-	-

Various equipment should be provided on rescue ships in such a way to perform multipurpose activities related to rescue and disaster prevention.

(vii) It will be necessary to construct new moorage-piers in Tg.Priok, Surabaya and so on, where Class I-A and I-B maritime safety rescue ships are to be allocated.

Table 3.1.4 Number and Allocation of Maritime Safety Rescue Ships

KANWIL		No.	KPLP Unit	Ship Class								ADPEL Class
				I-A	I-B	II	III		IV		V	
	(Jakarta)	1	KPLP Fleet			(9)						I
I	Medan	2	Belawan		1	2			2	(1)	3 (2)	I
		3	Sibolga				1	(1)			1 (1)	V
		4	Ulee Leue				1			(1)	1 (1)	
		5	Tg.Balai Asahan				1				1 (3)	V
II	Dumai	6	Dumai						1	(2)	1 (6)	III
		7	Tg.Uban		1	2	1		2	(1)	3 (7)	
		8	Tg.Pinang				1	(1)	1	(1)	1 (3)	IV
		9	Tilk Bayur			1	1		1	(1)	1 (3)	III
		10	Pekanbaru				1				1 (1)	IV
III	Jakarta	11	Tg.Priok	2		3		(1)	3	(2)	3 (2)	I
		12	Sunda Kelapa				1	(1)	1	(1)	1 (2)	IV
		13	Cirebon				1			(1)	1 (2)	III
		14	Jambi				1		1	(1)	1 (2)	IV
		15	Palembang			1			2	(2)	1 (1)	III
		16	Panjang				1		1	(1)	1 (1)	III
		17	Merak				1	(3)	1	(1)	1 (1)	
		18	Pontianak				1		1		1 (2)	III
		19	Benkulu				1				1	
IV	Surabaya	20	Surabaya/ Tg.Perak	2		3		(1)	2	(3)	3 (2)	I
		21	Semarang				1		1	(1)	1 (2)	III
		22	Cilacap			1			2	(1)	1 (1)	III
		23	Benoa			1	1	(1)			1	IV
		24	Lember/Ampenan				1			(1)	1 (1)	IV
		25	Kupang			1	1				1 (1)	
		26	Dilli				1				1	V
V	Banjarmasin	27	Banjarmasin				1		1	(2)	1	III
		28	Samarinda				1	(1)	1	(1)	1	III
		29	Balikpapan			1			2	(1)	3 (2)	III
		30	Sampit				1			(1)	1	IV
		31	Tarakan				1				1	IV
VI	Ujung Pandang	32	Ujung Pandang	2		1		(1)	3	(2)	3 (3)	I
		33	Pare Pare				1				1	V
		34	Kendari				1				1 (1)	IV
VII	Manado	35	Manado				1		1	(1)	1 (1)	V
		36	Bitung		1	1			2		3 (2)	III
		37	Donggala				1				1	
VIII	Ambon	38	Ambon		1	1		(2)	2		3 (3)	III
		39	Ternate				1				1 (2)	IV
IX	Jayapura	40	Jayapura		1	1		(1)	2	(1)	3 (1)	III
		41	Sorong				1	(1)	1		1	III
		42	Manokwari				1			(1)	1 (1)	V
		43	Biak				1				1 (1)	IV
		44	Merauke			1	1	(1)			1	IV
		45	Fak Fak				1			(1)	1 (1)	V
		Total		6	5	21(9)	33(16)		37(33)		62(65)	-

Note: Numbers in ( ) indicate the present numbers of maritime safety rescue ships.

(2) **SAR Aircraft**

(i) The DGSC is responsible for the execution of maritime safety and SAR activities, but does not have aircraft.

In order to carry out SAR activities such as prompt dispatch, search and lifting for marine accidents which increase and scatter in wide Indonesian waters, it is necessary to make use of highly mobile aircraft.

(ii) As shown in Table 3.1.5, the optimum allocation of aircraft is made based on the same analysis as in the maritime safety rescue ships and considering the following points.

- To cover the most areas by airplanes
- To cover most of accident-prone areas by helicopters
- To expand the operational coverage by refueling
- To participate in international SAR activities
- To allocate one combination of two airplanes and two helicopters at each station for operational readiness to fulfill 24-hour activities

Table 3.1.5 Number of Allocation of Aircraft

Type	KAN-WIL	DGSC Air Station	Airport	No. of Aircraft
Airplane	III	Jakarta	Jakarta	2
	VI	Ujung Pandang	Ujung Pandang	2
	Sub Total			4
Helicopter	I	Medan	Medan	2
	II	Tg.Uban	Tg.Uban	2
	III	Jakarta	Jakarta	2
	IV	Surabaya	Surabaya	2
	VI	Ujung Pandang	Ujung Pandang	2
	VIII	Ambon	Ambon	2
	Sub Total			12
	Total			16

(iii) The major particulars of aircraft are summarized below:

Table 3.1.6 Particulars of SAR Aircraft

	Airplane	Helicopter
Type	VLR (Very Long Range - radius of action of more than 1,000 NM, plus 2.5 hours search remaining)	HEL-M (Medium helicopter - maximum capacity for evacuating 15 persons/ endurance up to 3-3.5 hours)
Cruising speed	250 KT	135 KT
Cruising range	2,700 NM or more	450 NM
Operational radius	approx. 1,000 NM	175 NM

(3) Special Rescue Team

(i) Recently, some of the marine accidents which have occurred in the Indonesian waters have been getting complex and cannot be successfully met only by conventional SAR techniques and knowledge. The demand for a maritime special rescue system with highly specialized rescue techniques and skills has been increasing in rescue operations for vessels with dangerous cargoes, capsized or sunken vessels, and so on.

(ii) Special rescue teams will be formed to carry out the following special tasks, and the teams will be allocated at five special rescue stations.

- to rescue vessels carrying dangerous cargoes such as high pressure gas, toxic substances,
- to rescue crews of capsized or sunken vessels by utilizing skilled scuba diving techniques, and
- to send specially trained rescue teams by helicopter to scenes that maritime safety rescue ships could not approach.

(iii) Considering the actual status of ships' passage, occurrence of major marine accidents, etc., bases for special rescue teams should be provided in each of KANWILs II, III, IV, VI and VIII. Four teams (one team: five members) should be organized in each of the bases to maintain both the always ready system and the conduct of daily drills.

(iv) Special rescue teams should be professionally trained at a specific training facility.

(4) Ship Reporting System

(i) In order that general passing ships as well as the coastal nation's SAR units take prompt and effective SAR action in wide sea areas, the Maritime SAR Convention proposed the establishment of a ship reporting system.

(ii) In line with the above, various systems have already been put into operation, namely the Automated Mutual-assistance Vessel Rescue System (AMVER) in the U.S., Australian Ship Reporting System (AUSREP), Japanese Ship Reporting System (JASREP), and Indian Ship Position and Information Reporting System (INSPIRES).

(iii) The ship reporting system is a system for prompt and efficient search and rescue. Operations office periodically receives information on ships position, speed, course, etc., and stores them into data processing unit.

In case rescue is required, the operations office outputs the necessary data from the processing unit and sends such data to rescue ships navigating near a ship in distress. This system would make great contribution to the prompt and proper activities if data on sea condition, etc., in addition to the above data could be obtained.

(iv) In Indonesia, the ship reporting system may be implemented through the joint use of the SAR information networks, Message Exchange System (MES) and Management Information System (MIS) described in 3.3, (3), (iv) under the management of the Sea and Coast Guard (KPLP).

3.2 Marine Disaster Prevention

(1) In the event that disasters such as drought, high tide, volcanic eruption, etc., occur on islands where are hard of access, maritime safety rescue ships should discharge such duties as marine transport of rescue teams and victims, and emergency transport of commodities for rescue. Thus, the rescue ships should be built considering the following points:

(2) In the event that a fire breaks out and marine pollution occurs due to oil or toxic substances caused by accidents of tankers or oil-drilling facilities, special materials and equipment are needed to extinguish fire and remove oil, toxic substances and the like.

Governmental bodies or private bodies except for Pertamina (state-owned oil company) do not almost establish sufficient systems for disaster prevention such as oil outflows, fires and the like.

If and when large-scale oil spills or fires occur, the DGSC, namely KPLP, is to primarily control the operations for disaster prevention by mobilizing the equipment and materials from Pertamina and other organizations under the coordination of the DGSC and when necessary the BASARNAS will coordinate prevention system of the national disasters. For this purpose, it is suggested that the KPLP has minimumly required personnel engaged in disaster prevention and disaster prevention capabilities (such as materials and equipment for disaster prevention).

Materials and equipment for disaster prevention (such as oil outflows, fires, etc.) are considered as follows. It is planned that a part of them is provided on maritime safety rescue ships and the remaining ones are stored in on-shore bases for immediate delivery to accident spots.

Equipment and materials for disaster prevention:

- Foam concentrate
- Chemical dispersant

- Dry chemical powder
- Fire-fighting devices
- Safety devices for dangerous chemicals
- Gas indicator
- Oil boom
- Oil skimmer
- Handy oil recovery devices

(3) On-shore bases for marine disaster prevention units should be provided in the following nine ports:

Belawan, Tg.Uban, Tg.Priok, Palembang, Surabaya (Tg.Perak), Cilacap Balikpapan, Ujung Pandang and Bitung.

Maritime safety rescue ships of more than Class II is planned to be allocated in these nine ports.

(4) Marine disaster prevention personnel for maritime safety rescue ships should be professionally trained at a specific training facility. Practical drills should be conducted in each disaster prevention unit to elevate the skill for prevention of disasters. For this, instructors should be trained.

3.3 Maritime Safety and SAR Communications and Information System

(1) The coastal radio stations belonging to the DGSC provide public correspondence service. However, the highest priority in operation of coastal radio stations is given to all telecommunications concerning maritime safety at sea.

(2) As an international tendency concerning maritime safety communications, the SAR Convention was adopted in 1979, and development of epoch-making system for securing the maritime safety was decided in the 1979 general meeting of the International Maritime Organization (IMO). Such system is based on the integration of radiocommunication system on Morse signal for ships and the state-of-the-art technology. As a result, a global maritime distress and safety system (GMDSS) was newly developed.

In the GMDSS, global sea areas are divided into the following four sections according to operational coverage of coastal radio stations and coverage of international maritime satellite (INMARSAT). Radiocommunication facilities and satellite EPIRBs (emergency position indicating radio beacon) will be provided on ships, but depending on sea area. If a great number of satellite communication systems is employed, mutual communication among ships in distress, SAR organizations, rescue ships and aircraft could be realized and effective communication network could be configured.

Sea Area A1 - An area within the coverage of VHF coast stations.
Sea Area A2 - An area, excluding sea area A1, within the coverage of MF coast stations.
Sea Area A3 - An area, excluding sea areas A1 and A2, within the coverage of INMARSAT.
Sea Area A4 - The remaining sea areas outside sea areas A, A2 and A3.

(3) Introduction of the GMDSS on ships will be started in February, 1992. Presently, each country in the world makes preparation for its introduction.

As the future SAR plan in Indonesia, the GMDSS shall be introduced. When the GMDSS is introduced, it is necessary to establish the following systems with due consideration of the ongoing projects .

(i) Maritime Safety and SAR Telecommunication System

- Establish of COSPAS/SARSAT LUT (Local Use Terminal)
- Establishment of A1 Areas = VHF DSC (Digital Selective Calling) communications facilities
- Establishment of A2 Areas = MF DSC/NBDP (Narrow Band Direct Printing) communications facilities
- Establishment of A3 Areas = HF DSC/NBDP and INMARSAT Ship Earth Station (SES)
- Establishment of NAVTEX (Navigation Telex)

(ii) Maritime SAR Information Networks

- Establishment of trunk line networks
  - 1st Step: High speed communication by HF
  - 2nd Step: PALAPA satellite system
- Establishment of area information networks
- Network links with newly planned organizations
- Improvement of Tg.Uban Radio Station
- Establishment of aeronautical communications
- Establishment of marine radio direct telephone system (MRDTS)

(iii) Command and Control System

- Establishment of message exchange system (MES)
- Establishment of management information system (MIS)
- Establishment of area communications terminals

(iv) Ship Reporting System

- Collecting data and information of ship movement using SAR telecommunications system
- Transmission of data and information using MES
- Centralized management of data using MIS

(v) Related Facilities

- Electronic chart
- International telex
- Uninterrupted power supply system (UPS) and equipment protection devices (EPD)

(4) When the new communications system is to be introduced, necessary training related to its maintenance and operation needs to be conducted appropriately to meet the requirements of new technology.

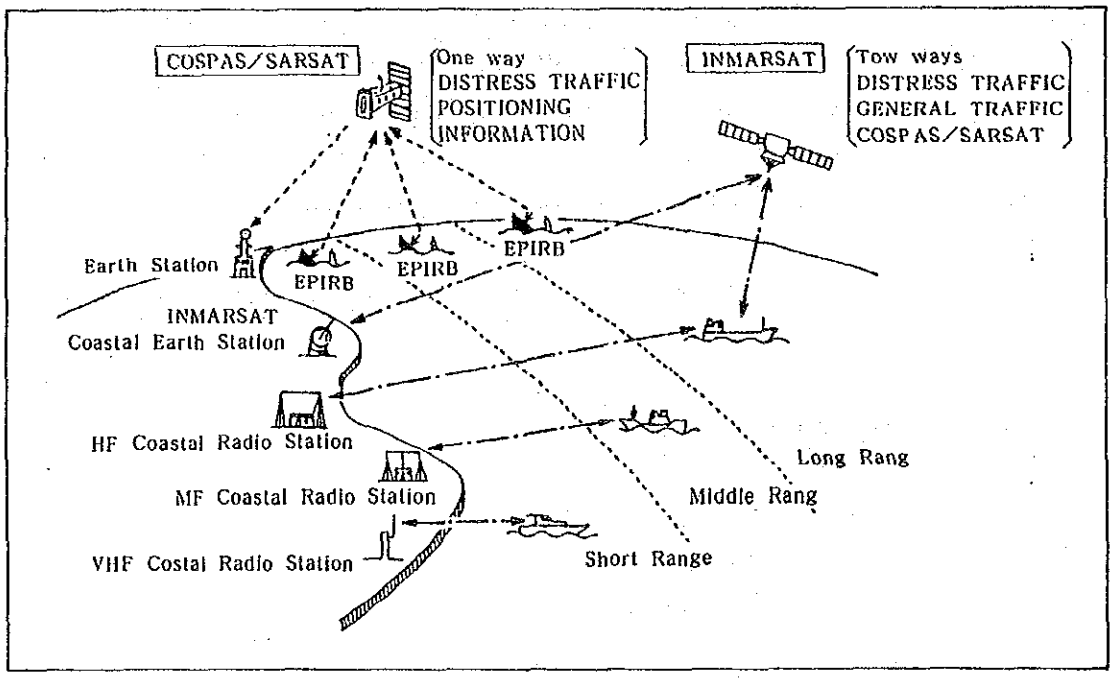


Fig. 3.3.1 Example of GMDSS Communications

3.4 Harbour Traffic Control System

Traffic control systems were adopted in several countries in the world to improve safety and efficiency of traffic and protect the environment in high traffic density ports or narrow and long channels.

The systems are categorized according to the degree of control as given below:

a. Information service
b. Traffic separation scheme
c. Pilot dependent management system
d. Vessel movement reporting system
e. Signal control
f. Vessel entering system requiring permission

Systems to be adopted depend according to geography of sea areas, traffic density, environmental condition and so on.

Field surveys were carried out from the viewpoint of developing a traffic control system mainly for the six ports of Palembang, Banjarmasin, Ujung Pandang, Surabaya (Tg.Perak), Belawan and Jakarta (Tg.Priok). Results of the surveys are as follows:

(1) Pilotage system was adopted to these six ports, and ships can receive necessary information and assistance for navigation from pilots.

(2) In Palembang, thick haze prevails about 3 to 4 times a year during the dry season and reduces the visibility to a maximum of about 25 m. In such cases, one way traffic is enforced to avoid the risk of their collision; alternative navigation of incoming and outgoing ships. A look of the occurrence of marine accidents by size and category of ships showed that accidents caused by small vessels which are not suitable for traffic control occupied the majority. It is difficult to establish a new traffic control system which would require an enormous investment.

(3) In Banjarmasin, there are signal stations for furnishing information to mariners in the following cases: When navigation is restricted, a red ball mark is hoisted in the daytime and a red light is displayed in the nighttime. When navigation is free, a white cone is hoisted in the daytime and a white light is displayed in the nighttime. Banjarmasin has a narrow and shallow channel, especially the entrance of the channel is high the density of collisions and strandings. It is suggested that a higher priority should be placed on improvement in channel conditions before the establishment of a traffic control system is considered.

(4) Three fairways in Ujung Pandang should be effectively utilized to improve the safety of traffic. For example, a traffic separation may be adopted; West fairway is for incoming only and north and north-west fairways are for outgoing use.

(5) Large ships are entered into two ports of Surabaya and Belawan. Because such ships are compelled to navigate in a narrow and long channel, it is necessary to establish a harbour traffic control center and to take measures to avoid the face-to-face navigation of more than a certain ship size in the channel. It is also necessary to arrange anchoring position of ships, because these ports are congested.

(6) The introduction of the harbour traffic control system in Jakarta is considered as a high priority after two ports of Surabaya and Belawan. Further development of Tg.Priok port is highly likely. It will, therefore, be necessary to assist with pilotage and to plan for traffic surveillance by radar in order to smooth the traffic.

(7) In order that the traffic control system may operate surely and effectively, legislations and/or revisions of the relevant regulations are needed. Specific training should be conducted for operations officers engaging in this operation.

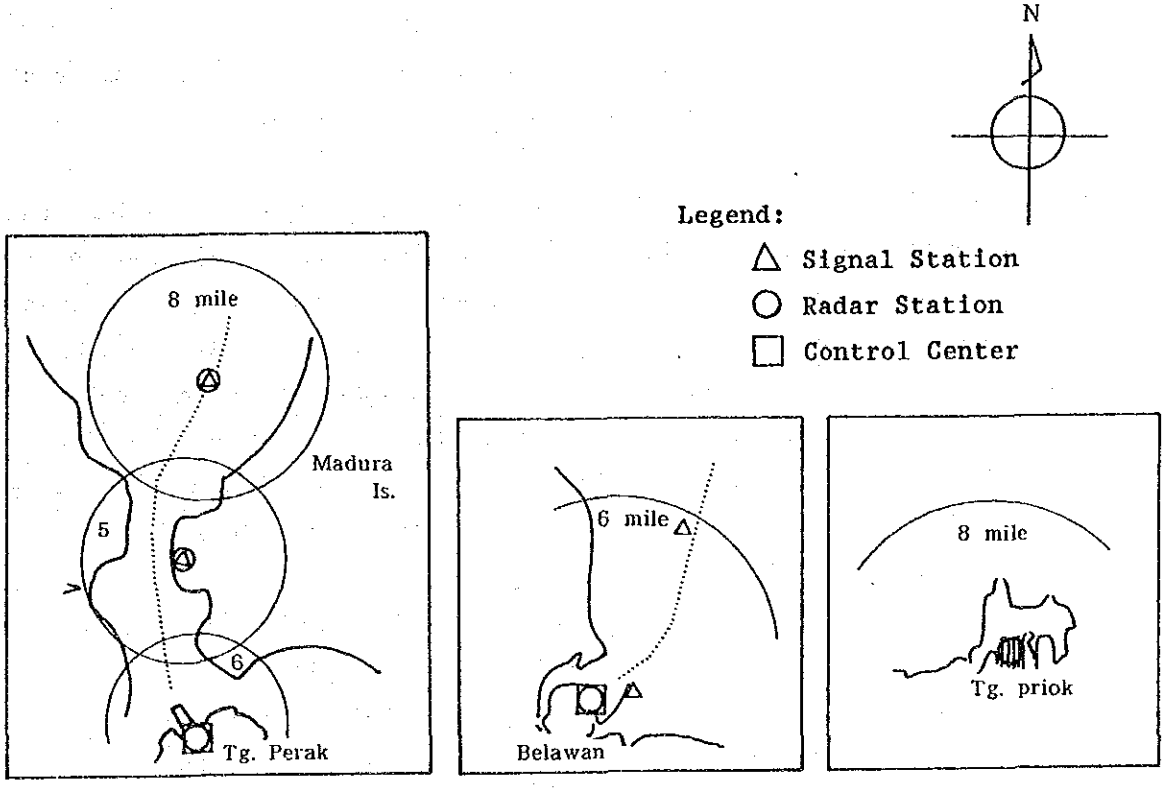


Fig. 3.4.1
Configuration for Traffic Control System in Surabaya

Fig. 3.4.2
Configuration for Traffic Control System in Belawan

Fig. 3.4.3
Configuration for Traffic Surveillance System in Jakarta

3.5 Education and Training System for Maritime Safety and SAR Personnel

(1) Indonesia is presently confronted with the shortage of competent maritime safety officers and maritime safety facilities.

(2) The educational system for seamen in Indonesia is under the responsibility of the Ministry of Communications which administers the national and private merchant marine institutes and schools for the education and training of seamen. Presently, there is not an education system and an institute established for the specific purpose of educating and training maritime safety officers. Short-term training had previously been conducted for the newly recruited personnel, but is is not carried out at present.

(3) Maritime safety education and training cover the specific fields not only of seamen affairs but also of maritime administrators. Accordingly, the graduates of other institutes such as Merchant Marine Academies can not be expected to execute those duties.

(4) For such reasons, the marine safety authorities in other nations have established their own academies such as the U.S. Coast Guard Academy, Maritime Safety Academy in Japan, and so on. In order to establish the maritime safety system in Indonesia, a DGSC Academy for training maritime safety personnel needs to be established.

(5) An outline of the DGSC Academy is as follows:

. Number of personnel to be recruited	about 50 persons per year
. Admission requirements	Same requirements as that of Merchant Marine Academy and Naval Academy
. School years	Four years (including cruise training for the total of one year)
. Location	Jakarta
. Number of instructors	about 40 instructors
. Number of administrative staff	about 40 staff
. Number of cadets to be admitted	200 cadets (compulsory dormitory)

. Main facilities	Main hall, classrooms, laboratories, auditorium/gymnasium, library, dormitory, dining room, medical room, pier, swimming pool, fire fighting facilities for vessels, training facilities for disaster prevention, boat house and garage, training ship, others

(6) The instructors of the DGSC Academy will be divided into educational groups of general and professional subjects. The development and improvement in quality of the instructors of the DGSC Academy will be of cardinal importance in parallel with the establishment of modern educational facilities.

It is recommended that in principle the education for instructors in the basic subjects and the professional subjects be provided according to the existing system of education for instructors in Indonesia, supplemented by the introduction of a new system in which the candidate instructors will be sent abroad for their further study and also specialists will be invited from foreign countries as guest instructors as well.

(7) It will take many years for the first graduates of the DGSC Academy to become officials, who carry out their tasks engaging at the front line, as soon as possible. However, it is necessary to improve the maritime safety system at an early date and to train junior maritime safety officials who have the knowledge and skill of carrying out the tasks as an administrator engaging at the front line. As the first step, the DGSC should establish a maritime safety training center (MSTC) for the purpose of 1) training recruits and retraining the incumbent personnel, and 2) training special technologies and conducting R&D related to maritime safety technology and methodology.

3.6 Maritime Safety and SAR Organizational System

(1) The DGSC has the responsibility for the maritime safety in Indonesia, and the KPLP belonging to the DGSC has the responsibility for SAR activities. Organizations other than the KPLP cooperate for large-scale SAR activities under the coordination of BASARNAS.

(2) In order to effectively carry out maritime safety and SAR activities, it is necessary to newly establish or reinforce the organizations for 1) collecting information on SAR, and carrying out command control, 2) investigating, taking statistics of and analyzing the cause of accident, and 3) conducting R&D related to SAR technology and facilities.

(3) An outline of overall organization plan is as follows: (refer to Fig. 3.6.1)

(i) Collection of information on SAR activities, and command control and operation system for rescue ships, aircraft and each KANWIL.

- Operations office room (24-hour watch system) (under direct control of the head of KANWIL) to be newly established
- Watch team (24-hour watch system) (port administrator office) to be newly established
- Mission control center (Directorate of Navigation) to be newly established

(ii) SAR system

- KPLP fleet (under the direct control of directors of DGSC) to be reinforced
- Air stations (under the direct control of directors of DGSC) to be newly established
- Special rescue stations (under direct control of the directors of DGSC) to be newly established

(iii) Marine disaster prevention and harbour traffic control system

- Marine disaster prevention section (KPLP) to be newly established
- Marine disaster prevention section (KANWIL) to be newly established
- Marine disaster prevention sub-section (port administrator office) to be newly established
- Harbour traffic control surveillance center (port administrator office) to be newly established

(iv) Training system of SAR knowledge and special technologies, and R&D related to SAR technology and facilities

- DGSC Academy (or MSTC) (under the direct control of directors of DGSC) to be newly established
- Maritime safety technology center (under the direct control of directors of DGSC) to be reinforced

(v) System for investigating, taking statistics of and analyzing the cause of accident

- Marine accident investigation and statistics section (directorate of marine safety) to be newly established

(vi) System for international SAR activities and coordination with other organizations

- Planning and coordination section (KPLP) to be newly established

(vii) System for control, improvement and operation of rescue ships, aircraft and communications facilities, and for assistance of SAR activities from private sectors

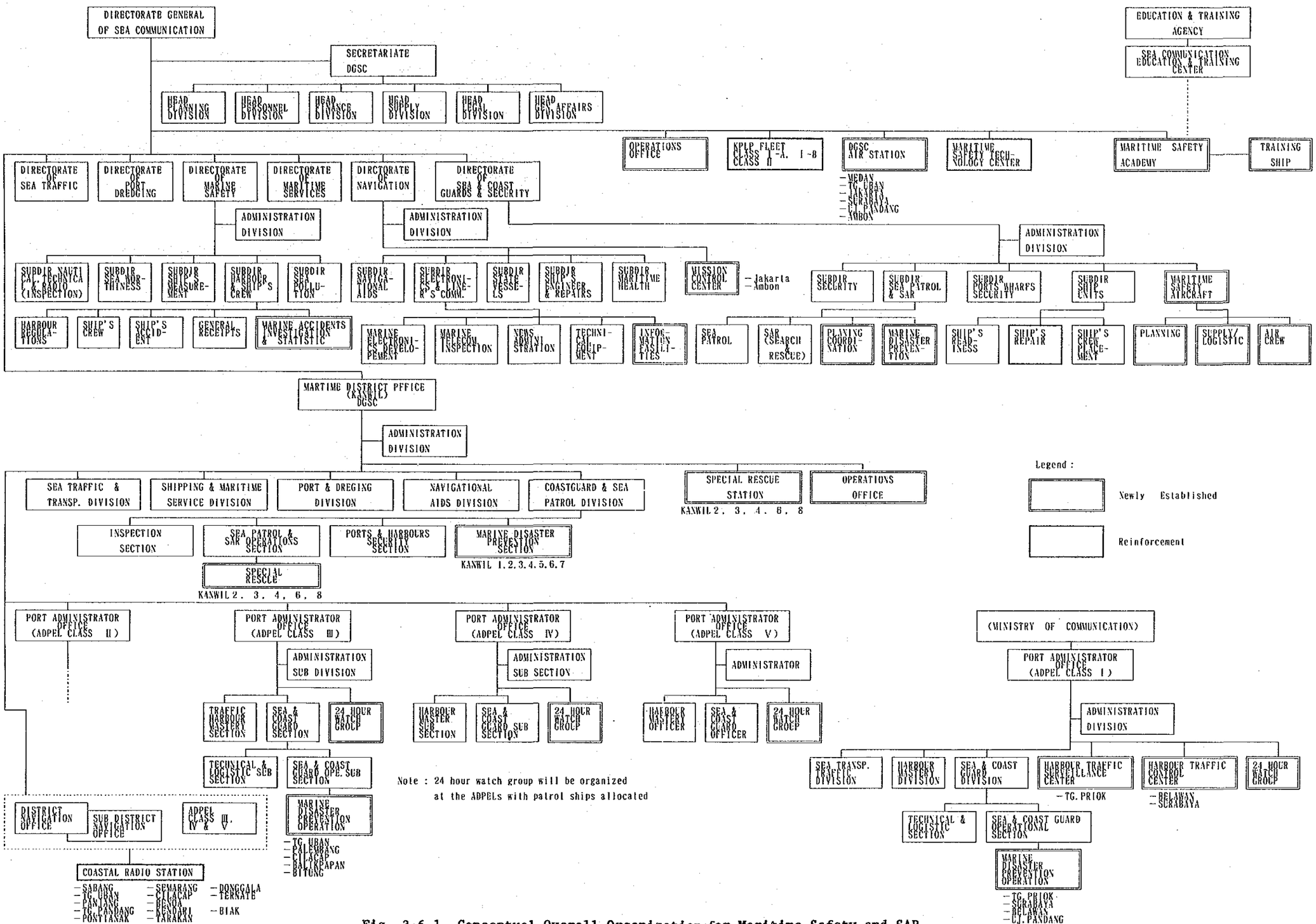


Fig. 3.6.1 Conceptual Overall Organization for Maritime Safety and SAR

Section 4 Short-term Development Plan

The short-term development plan is the five-year improvement plan starting from 1989 to fit into the framework of the Fifth Five-year Development Plan in Indonesia. The following items are to be improved, considering the situation of marine environment, marine accidents, socio-economic development, governmental policies, international tendency, etc.

4.1 SAR and Disaster Prevention System

The system for quickly and surely saving lives, ships and cargoes involving marine accidents which occurs in marine accident-prone sea area, and reliefing disasters needs to be established.

(1) Maritime Safety Rescue Ships

(i) Number of ships by type and bases to be allocated

Table 4.1.1 Number of Ships by Type and Bases to be Allocated

Class	Number of Ships	Planned Base
Class I-A	3	Tg.Priok, Surabaya, Ujung Pandang
Class I-B	2	Tg.Uban, Belawan
Class II	2	Tg.Priok, Surabaya

(ii) Particulars of ships by type and main equipment

Particulars of ships are described in 3.1, (1), (vi). Class I-A and I-B ships should have capabilities for towing, salvage, fire fighting when chemicals are burnt, and the following materials and equipment for disaster prevention should be provided on Class II ships or more, so that these ships could be used for multipurpose activities.

Table 4.1.2 Materials and Equipment for Disaster Prevention to be Provided on Ships

Equipment and materials	Class		
	I-A	I-B	II
Oil boom	400 m	200 m	-
Chemical dispersant	2 kℓ	2 kℓ	-
Foam concentrate	2 kℓ	2 kℓ	-
Fire-fighting devices	30 sets	30 sets	10 sets
Handy oil recovery devices	10 sets	10 sets	5 sets
Safety devices for dangerous chemicals	3 sets	3 sets	2 sets
Gas indicators	2 sets	2 sets	2 sets

(2) Mooring Piers for Exclusive Use of Maritime Safety Rescue Ships

The following piers will be newly constructed in bases where Class I-A and I-B ships are to be allocated.

Table 4.1.3 Size and Location of Mooring Piers

Class	Length (m)	Width (m)	Deck Thickness (m)	Planned Base for Installation of Pier
I-A	95	6	0.25	Tg.Priok, Surabaya, Ujung Pandang
I-B	75	5	0.20	Tg.Uban, Belawan

(3) Special Rescue Teams

Special rescue teams will be organized in two locations of Jakarta and Surabaya, and the always ready system will be established.

- One team: Five members
- One base: Four teams (20 persons), and head, deputy and administrator (each one)
- Special rescue station building: Office, watch room, communication room, storage for materials, etc.

(4) Bases for Marine Disaster Prevention

Warehouses for disaster prevention materials and equipment will be constructed in each of five bases, where multipurpose rescue ships are to be allocated, out of nine bases for marine disaster prevention, in order to cope with oil outflow from ships.

Table 4.1.4 Materials and Equipment for Disaster Prevention

Equipment and materials for disaster prevention	Base				
	Belawan	Tg.Uban	Tg.Priok	Surabaya	Uj.Pandang
Oil boom	1,600 m	1,600 m	1,400 m	1,400 m	1,400 m
Oil skimmer	100 kℓ/hr x 1 unit 30 kℓ/hr x 1 unit	100 kℓ/hr x 1 unit 30 kℓ/hr x 1 unit	100 kℓ/hr x 1 unit 30 kℓ/hr x 1 unit	100 kp/hr x 1 unit 30 kℓ/hr x 1 unit	100 kℓ/hr x 1 unit 30 kℓ/hr x 1 unit
Chemical dispersant	68 kℓ	68 kℓ	68 kℓ	68 kℓ	68 kℓ

(5) Approximate Cost Estimation

Ships	Rp. 154,200 million
Piers	Rp. 492 million
Special rescue teams	Rp. 7,848 million
Materials and equipment for disaster prevention	Rp. 10,665 million
Total	Rp. 173,205 million

4.2 Maritime Safety and SAR Communications and Information System

For effective rescue of ships in distress, distress information needs to be promptly transmitted to SAR organizations. For this purpose, minimumly required system will be established at an early date.

(1) System for Transmitting Distress Information

The spread of radiocommunications facilities on ships for domestic service among Indonesian flag ships is not sufficient. In the event that a ship is in distress, it is difficult to transmit distress information to SAR organizations. It is proposed that the Indonesian Government manages registration and quality of emergency position indicating radio beacons (EPIRBs) as emergency communication equipment.

(i) Outline of system

Battery-operated EPIRBs as emergency communication equipment are proposed by the following reasons. In case of an accident, the EPIRB will be automatically floated free from a ship in distress to transmit distress alert signal. 2,182 KHz EPIRB will be suitable.

- The majority of ships for domestic service are sailing vessel, and it is difficult to secure power sources on such vessels.
- It is unexpensive and easy to operate.
- The DGSC's main coastal radio stations maintain watches on the international distress frequency of 2,182 KHz.
- It is easy to locate the distress position through direction finders, and to identify ship name immediately after reception of distress signal.

(ii) Required number of EPIRBs

Considering a great number of accidents by ships for domestic service, the first priority for installation of EPIRBs on board is given to ships which are not equipped with radiocommunication facilities. The required number of EPIRBs is about 6,600.

(2) System for Prompt Transmission and Processing of SAR Information

Coastal radio stations in Indonesia receive distress information and such distress information are precisely transmitted to SAR organizations and processed through communications network by high frequency. For precise transmission and processing, introduction of a TTY message exchange system (MES), that is capable of transmitting written information, is required.

(i) Outline of system

The MES consists of the main information exchange equipment and TTY terminal equipment installed at the relevant offices.

The main information exchange equipment is an automatic exchange system that automatically receives data input through the TTY terminal equipment, and transmits them simultaneously to the designated destinations by reading the destination data contained in the information. The existing communications networks will be co-used for the links.

(ii) Establishment Plan of the MES

The MES will be established under the ongoing project in the DGSC in the Jakarta area. Each main equipment will be installed in eight KANWILs except KANWIL III, and terminal equipment will be installed in relevant organizations.

(3) Network Links with Newly Established Organizations

The network links with organizations which are newly established in the short-term plan will be provided.

- Operations office and watch room (DGSC, KANWIL and Port Administrator Office)
- Special rescue bases (Jakarta and Surabaya)
- Harbour Traffic Control Center (Surabaya)

(4) Approximate Cost Estimation

EPIRB	Rp. 12,722 million
MES	Rp. 8,738 million
Total	Rp. 21,460 million

(Costs for network links for newly established organizations are estimated in respective items.)

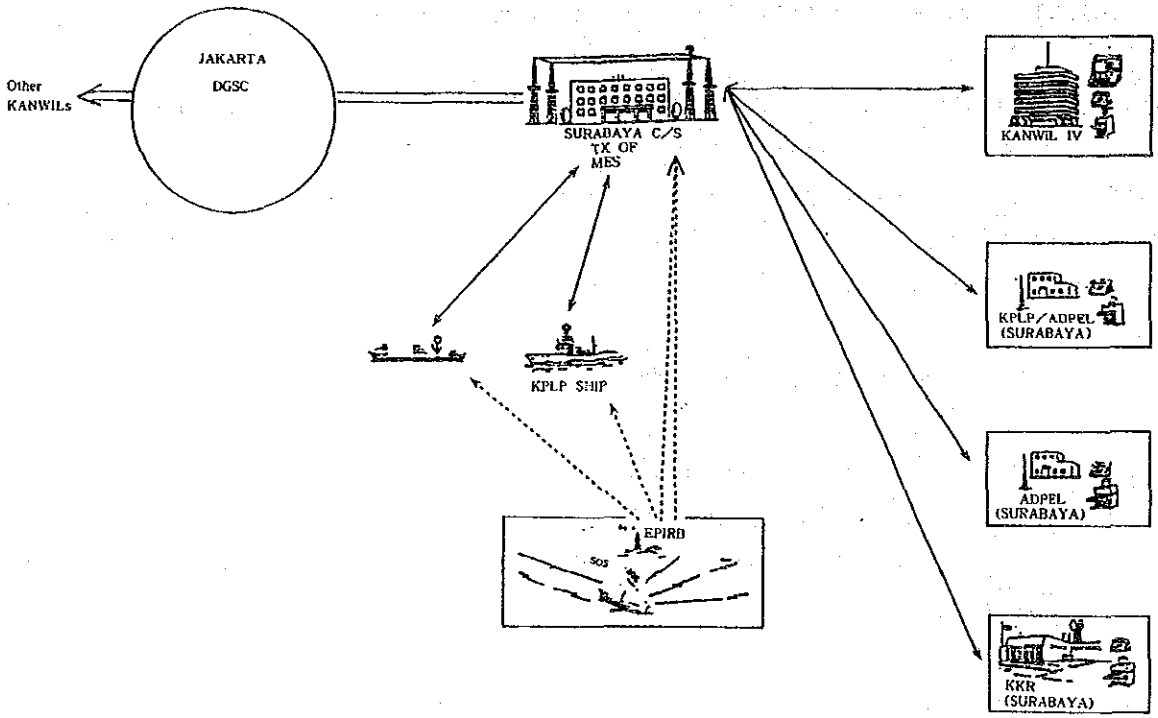


Fig. 4.2.1 Example Showing EPIRB communication Network

4.3 Harbour Traffic Control System

A Harbour Traffic Control Center will be established in Surabaya Port (Tg.Perak) where priority for introduction of traffic control system is the most highest among three ports.

(1) Establishment Plan

(i) Organization

It may be appropriate that the traffic control center be organized under the direct control of the Port Administrator.

The following organization may be appropriate as a minimum.

Head	1 person
Deputy Head	1 person
Operations officers	12 persons
(Traffic control planner	1 person x 3 shifts = 3 persons
(Operations officer)	3 persons x 3 shifts = 9 persons
Reserve personnel	3 persons
Maintenance and repair staff	4 persons
Total	21 persons

(ii) Facilities

- Harbour Traffic Control Center (near Port Administrator Office)
  - . Operation and control consoles
  - . Radar station
  - . Radar image processing unit
  - . ITV
  - . Information management unit
  - . Remote control unit for radar and signal
  - . Communications facilities

- Radar and Signal Stations (Karang Jamuang, Madura)
  - . Radar stations
  - . Signal stations

(2) Approximate Cost Estimation

Harbour Traffic Control Center	Rp. 22,770 million
Radar and Signal Stations	Rp. 14,251 million
Total	Rp. 37,021 million

4.4 Maritime Safety Training Center (MSTC)

The education and training system should be improved to cultivate DGSC-related personnel from the long-term viewpoint.

In order to secure personnel having expertise and special skill, it is suggested that a Maritime Safety Training Center (MSTC) having the following functions be urgently established in the DGSC and training be strongly promoted.

- Training of newly recruited personnel
- Re-training of present personnel
- Training of special technologies
- R&D related to special technology and methodology

The MSTC plan is assumed as follows. However, the training courses to be conducted at the MSTC are subject to change according to demands on the administration.

(1) Outline of Training System

(i) General training

. Training of newly recruited personnel and re-training of present personnel

(ii) Special training

. Special rescue
. Rescue diving
. Disaster prevention

- Information communications
- Navigation aids
- Harbour traffic control
- Investigation and analysis of causes of marine accidents
- R&D in rescue technique
- R&D related to marine disaster prevention
- Improvement and development of materials and equipment for rescue

(2) Number of Personnel to be Trained and Training Period

. Number of personnel to be trained for one course:	about 40 persons
. Training period:	from three to six months
. Number of personnels to be admitted:	about 200 persons
. Number of personnels to be trained:	about 700 persons/year

(3) Organization

The MSTC will be administered and managed by the DGSC. About 120 personnel consisting of 50 instructors and 70 administration staff would be suitable for the MSTC. Experts in each section of the DGSC will be assigned as instructors, but cooperation from external instructors will be obtained as necessary, because there is a variety of training courses.

It is necessary for personnel suitable for instructors to participate in overseas training, or receive instructions from foreign instructors.

(4) Plan of Buildings and Facilities

(i) Buildings

- Main building (classrooms, instructors' room, office and so on)
- Building for practice and experiment
- Auditorium and gymnasium
- Dormitory and canteen

(ii) Training facilities

- Training tower for rangers
- Swimming pool
- Fire fighting facilities
- Pier

(5) Approximate Cost Estimation

Buildings	Rp. 20,600 million
Training facilities	Rp. 9,100 million
Materials and equipment for training	Rp. 16,000 million
Total	Rp. 45,700 million

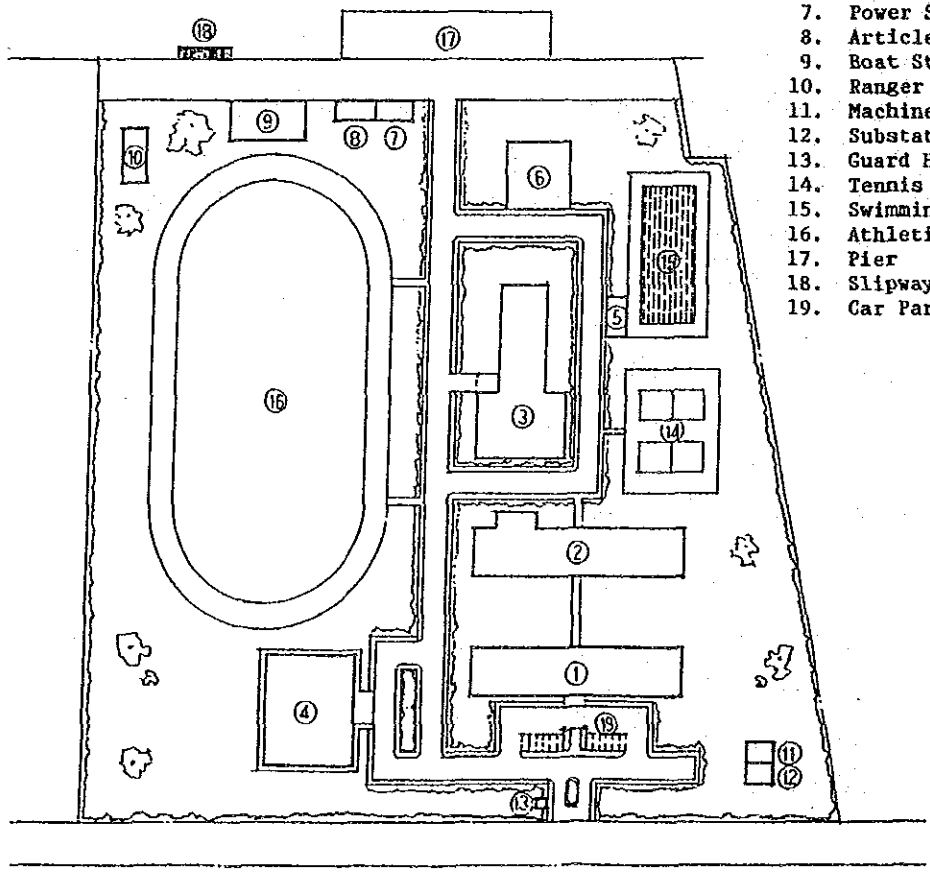


Fig. 4.4.1 Layout Plan of Facilities for MSTC

4.5 Organizational System

The most important task of the short-term plan is to centralizedly monitor and control the movements of all ships belonging to the DGSC. In the event of marine accidents, the proper commanding and operating system should be established so as to intensively mobilize these ships. Establishment and reinforcement of the DGSC organizations are needed to strengthen the organizational system, as mentioned above.

(1) Operations Office System

- Establishment of Operations Office in the DGSC (24-hour watch system)
- Establishment of Operations Office in each KANWIL (24-hour watch system)
- Establishment of 24-hour watch group system for SAR in each Port Administrator Office
- Establishment of planning and coordinating section in Sub-Directorate Sea Patrol and SAR of KPLP

(2) Repair and Maintenance System for Maritime Safety Rescue Ships

- Reinforcement of administrative personnel in Sub-Directorate Ship Units and Ship Repair Section of KPLP

(3) Special Rescue System

- New establishment of special rescue bases in KANWIL III and IV
- New establishment of special rescue sub-section in the Sea Patrol & SAR Operations Section of KANWIL III and IV

(4) Marine Disaster Prevention System

- New establishment of marine disaster prevention section in Sub-Directorate Sea Patrol and SAR of KPLP

(5) **Harbour Traffic Control System**

. New establishment of Harbour Traffic Control Center in Surabaya Port Administrator Office

(6) **Training System**

. New establishment of MSTC in the DGSC

(7) **Approximate Cost Estimation**

Large-sized console	899 x 10 places	= Rp.	8,990 million
Medium-sized console	141 x 15 "	= Rp.	2,115 million
Small-sized console	97 x 29 "	= Rp.	2,813 million
Total		Rp.	13,918 million

Section 5 Promotion and Budget for Development Plans

5.1 Development policies and Evolution of Development Plans

(1) Development Policies

The Long-term Plan aims at gradually enhancing and improving, through realistic and step-by-step approaches, the overall performance of the maritime safety system. For this purpose, development plans would be promoted considering the following items.

(i) Establishment of the maritime safety system in line with development stages of the national economy

The role of the maritime safety system is to support the sea transportation to promote smooth flow of cargoes and people in addition to sustaining maritime industries. The maritime safety system should be implemented hand-in-hand with, and cannot be separated from, the national economic development.

(ii) Establishment of a "compact and efficient" system

Facilities and personnel are to be fully utilized and coordinated with each other through a well-mannered operative management system, which generates efficiency throughout the system, because there is a variety of maritime safety tasks and these tasks have mutual connection with each other.

(iii) Establishment of a maritime safety system that enables autonomous development

The orientation of the development should be towards establishing an autonomous system in which qualified and well-trained professional members of maritime safety can, by themselves, review, adjust, and improve the whole system periodically. As a result, the system will continually be improved.

(2) **Evolution of Development Plans**

Phase-promotion of the development plans are divided into the following three stages:

Stage 1. Solution of Urgent Problems (Repelita V)

- To establish a minimal management system of maritime safety including structures and equipment urgently required, and
- To start training, research and development functions, which take a long time to accomplish.

Stage 2. Preparation for Expansion (Repelita VI)

- To apply improvement measures to pilot plans,
- To enhance and improve the maritime safety system through step-by-step approaches, and
- To expand improvement applications to wider areas.

Stage 3. Stabilization of Expansion (Repelita VII)

- To deploy trained professionals who have finished their training started in Stage 1 (one),
- To employ an assessment system so that the overall maritime safety measures can be reviewed periodically by utilizing research and development results,
- To adjust and apply improvement measures of maritime safety based on the assessment, and
- Eventually, to establish an autonomous improvement system, which consists of the above-mentioned assessment, adjustment, and application procedures, by trained maritime safety professionals themselves.

5.2 Selection of Priority Projects

(1) Main projects will be formulated according to the Master Plan to divide the phase-improvement plan.

(2) The Maste Plan comprises the following three types of projects:

- Facilities,
- Organizational system, and
- Manpower development (education and training)

Projects can be classified into two types; one concerns facility construction (hardware) and the other relates to facility usage and administrative method (Software), and both have a complementary relationship with each other. If either one of these is absent, effective functions could not be expected. Combination of hardware and software aspects should be fully considered when projects are packaged.

(3) Maritime safety activities are broadly divided in the following order:

- Activities for marine disaster prevention,
- Activities for collection of distress information, and
- SAR activities and so on

A conceptual flow of maritime safety activities mainly focussing SAR activities is shown in Fig. 5.2.1.

As can be seen from Fig. 5.2.1, above these facilities and operation system are complicatedly linked together in the flow from the occurrence of marine accidents to damage reduction by SAR activities, and it is difficult to individually divide maritime safety activities. Especially, total SAR operation system consists of communications related to information collection, operations office, MES, and ships. If either one of them is absent, they do not function effectively. Therefore, it is impossible to individually separate maritime safety activities in terms of effect.

It may be appropriate to develop SAR system (including communications and organizational systems and so on) in the following order:

- Phase I: Establishment of a minimal SAR system in accident-prone sea areas
- Phase II: Expansion of SAR system in all sea areas in Indonesia
- Phase III: Reinforcement of SAR system from the qualitative and quantitative viewpoint

(4) In order to efficiently operate SAR activities by making full use of various established facilities, it is important to develop and secure human resources, but it takes a long time to do so. Therefore, the MSTC needs to be established and overseas training for SAR activities needs to be conducted at an early date (Phase I).

Harbour Traffic Control System should be introduced in each port in the order of Surabaya (Tg.Perak), Belawan and Jakarta (Tg.Priok), considering the development of each port.

(5) Investment schedule for each project is shown in Table 5.2.1.

5.3 Comparison of Required Expenses and Available Budget

(1) Estimation of Available Budget

The budget related to Master Plan occupies about 11.5% of the budget for the Sea Transport sector in Repelita V. Therefore, available budget for the Master Plan (1989-2005) is estimated as follows:

Rp. 8,634.7 billion x 0.115 = Rp. 993 billion

(Presumptive conditions for budget estimation)

- GDP in 1987 is Rp. 110,171.5 billion
- The annual growth rate of GDP is 4%.
- Percentage of development budget (real value) occupied in GDP is 12%. (such percentage between 1981 and 1985 = 11.5%)

- Percentage of transport sector budget occupied in development budget is 14%. (such percentage between 1981 and 1987 = 13.6%)
- Percentage of sea transport sector budget occupied in transport sector budget is 18%. (such percentage between 1981 and 1987 = 17.4%)

Based on the above, sea transport budget (between 1989 and 2005) is estimated to be Rp. 8,634.7 billion.

(2) Comparison of Estimated Amount for the Master Plan and Budget

Estimated amount for the Master Plan	Rp. 1,061,800 million
Budget/funds	Rp. 993,000 million
Balance	Rp. 68,800 million

(3) Comparison of Estimated Amount for Short-term Development Plan of the Master Plan and Budget

Estimated amount	Rp. 292.6 billion
Budget	Rp. 224.8 billion
Balance	Rp. 67.8 billion

(4) Factors Subjects to Change: The available amount of Rp. 993 billion is based on the above assumption, and is fluctuated by the following factors:

- Growth rate of GDP
- Obtained amount of foreign funds and exchange rate
- National policy towards allocation of funds
- Attitude on maritime safety within the sea transport sector
- As for Repelita V, the necessary budget for ongoing projects concerning maritime safety influences the schedule for application of this Study.

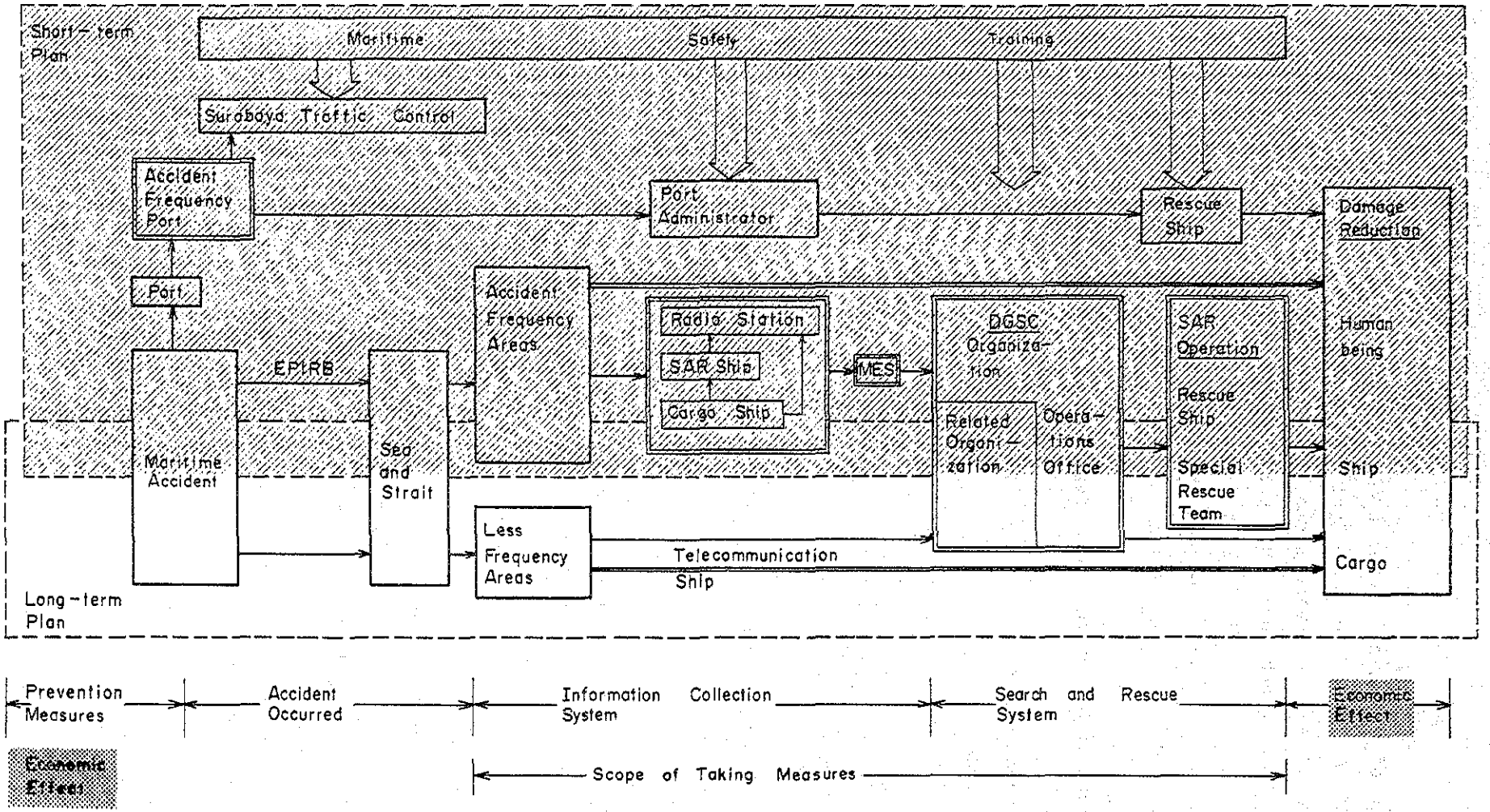


Fig. 5.2.1 Conceptual Flow of Maritime Safety Activities

(5) Conclusion

In wide Indonesian waters, it is the very important duty of the nation to secure the safety of such activities at sea as transport of cargoes and passengers, fishing, prevent marine disaster and rescue persons from marine accidents.

Since the share of budgets/funds for maritime safety has been observed to be small when compared with those for other fields in the sea transport sector, the maritime safety systems/organizations are not sufficient. Thus, this fact brings about loss of valuable life and property at sea.

In this development plan, emphasis is placed on training the personnel engaged in SAR activities and reinforcing maritime safety rescue ships. Therefore, it is considered that this reinforcement has brought about the excess of budget as compared with the past development budget. Excess of budget for Short- and Long-term Plans is Rp. 67.8 billion and Rp. 68.8 billion, respectively.

As far as the budget for Repelita V (Rolling Plan) is concerned, the budget for items related to the Master Plan amounts to Rp. 350.5 billion. While, maritime safety budget in the target of the development budget in the sea transport sector is Rp. 317.3 billion, which is slightly smaller than the amount targeted in the Rolling Plan.

As this Study has been carried out from such a very essential point of view as setting the highest value on a human life, it is recommended that the necessary budgets/funds shall be raised by effort, since the amount from the data in the past would be fundamental, though, but should not be adhered only to, and shall be deemed as an advance investment and then all the projects planned in this Study would better be implemented towards 2005.

Table 5.2.1 Investment Schedule for Master Plan

(Unit:Rp. Million)

	Investment Cost	REPELITA V					REPELITA VI					REPELITA VII					REPELITA VIII	
		1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Operations Office	13,918																	
a. Large Console	8,990			4,495	4,495													
b. Medium Console	2,115			1,058	1,057													
c. Small Console	2,813			1,407	1,406													
Maritime Safety Rescue	472,211																	
Ships & Rescue System																		
a. Maritime Safety	471,719																	
Ships																		
:Class I-A	185,040			30,840	30,840	30,840										30,840	30,840	30,840
:Class I-B	115,650	23,130	23,130											23,130	23,130			23,130
:Class II	92,520				7,710	7,710	7,710	7,710	7,710	7,710	7,710	7,710	7,710	7,710	7,710	7,710		
:Class III	72,084						6,553	6,553	6,553	6,553	6,553	6,553	6,553	6,553	6,553		6,553	6,554
:Class IV	6,425						1,606		3,213	1,606								
b. Moorage Piers	492																	
:Class I-A	322			108	107	107												
:Class I-B	170	85	85															
Air Operations	214,803																	
a. Air Stations	32,846																	
:Large Scale	19,900												9,950	9,950				
:Small Scale	12,946						3,237	3,237	3,236	3,236								
b. Communications																		
Facilities	11,623						1,937	1,937	1,937	1,937		3,875						
c. Air Craft	170,334																	
:Fixed Wing	77,849														19,462	19,462	19,462	19,463
:Helicopters	92,485						7,707	7,707	7,707	7,707	7,707	7,707				15,414	15,414	15,415
Dissaster Prevention																		
Units	19,197			10,665							8,532							
Special Rescue System	19,625		3,924	3,924			3,926	3,926	3,925									
Maritime SAR Communication	202,181																	
and Information System																		
a. SAR Telecommunication	65,356																	
System																		
:LUT	9,072											4,536	4,536					
:VHF DSC	8,661						4,331	4,330										
:MF DSC/NBDP	24,441								6,110	6,110	6,110	6,111						
:HF DSC/NBDP & INMARSES	10,460												5,230	5,230				
:EPIRB	12,722			3,855	3,855	5,012												
b. SAR Information Network	101,232																	
:Trunk Line Networks	42,199											14,066	14,066	14,067				
:Area Information	30,917									15,459	15,458							
:Aeronautical Communi-																		
cation and Office	28,116						9,372	9,372					9,372					
c. Command Control	14,674																	
Communication System																		
:MES	8,738			2,913	2,912	2,913												
:MIS	1,002						501	501										
:Area Communication	4,934								2,467	2,467								
Terminal																		
d. Associated	20,919						2,510	2,510	2,510		4,393	4,393	4,603					
Installations																		
Harbour Traffic Control	66,695																	
Center																		
a. Surabaya	37,021	18,511	18,510															
b. Belawan	19,512							9,756	9,756									
c. Jakarta	10,162														10,162			
Maritime Information																		
Control System, NAVTEX	6,142											3,071	3,071					
SAR Overseas Training	1,284	1,284																
Maritime Safety	45,700																	
Training Center																		
a. Building	20,600	10,300	10,300															
b. Facility	9,100		4,550	4,550														
c. Materials	16,000		8,000	8,000														
Total Investment	1,061,756	53,310	68,499	71,815	52,382	46,582	49,390	57,539	55,124	52,785	56,463	58,022	65,091	66,640	67,017	73,426	72,269	95,402
		REPELITA V Total = 292,588					REPELITA VI Total = 271,301					REPELITA VII Total = 330,196					REPELITA VIII = 167,671	

Section 6 Organization of the Study

6.1 Study Team and Advisory Committee

The members dispatched are listed in Tables 6.1.1 through 6.1.5.

Table 6.1.1 Study Team Members Dispatched
(Phase I; Oct.-Dec., 1987)

Name	Assignment	Position
Mr. R. Shiobara	Team leader Forecast of marine accidents	Japan Association for Preventing Marine Accidents
Mr. H. Manabe	Development plan	Yachiyo Engineering Co., Ltd.
Mr. O. Hosokawa	Analysis of marine accidents	Japan Association for Preventing Marine Accidents
Mr. Takahashi	Maritime activities	Yachiyo Engineering Co., Ltd.
Mr. T. Onda	Organizational System	Japan Life Boat Institution
Mr. M. Kida	Rescue system	"
Mr. M. Sakamoto	Prevention of marine disasters	"
Mr. T. Chiba	Education and training	Japan Association for Preventing Marine Accidents
Mr. M. Katayama	Communications and information	"
Mr. S. Tokieda	Harbour traffic control (plan)	"
Mr. M. Danno	Economic evaluation	Yachiyo Engineering Co., Ltd.

Table 6.1.2 Study Team Members Dispatched
(Phase II; Jul.-Sept., 1988)

Name	Assignment	Position
Mr. I. Yoshino	Team leader	Japan Association for Preventing Marine Accidents
Mr. H. Manabe	Development plan	Yachiyo Engineering Co., Ltd.
Mr. T. Onda	Organizational system	Japan Life Boat Institution
Mr. T. Noma	Rescue system	"
Mr. M. Sakamoto	Prevention of marine disasters	"
Mr. M. Saito	Education and training (plan)	Japan Association for Preventing Marine Accidents
Mr. T. Chiba	Education and training (facility)	"
Mr. K. Watano	Communications and information	"
Mr. S. Tokieda	Harbour traffic control (plan)	"
Mr. K. Naohara	Harbour traffic control (facility)	"
Mr. M. Danno	Economic evaluation	Yachiyo Engineering Co., Ltd.

Table 6.1.3 Study Team Members Dispatched
(Phase II; Dec., 1988)

Name	Assignment	Position
Mr. I. Yoshino	Team leader	Japan Association for Preventing Marine Accidents
Mr. T. Noma	Rescue system	Japan Life Boat Institution
Mr. M. Saito	Education and training (plan)	Japan Association for Preventing Marine Accidents
Mr. T. Chiba	Education and training (facility)	"
Mr. K. Watano	Communications and information	"

(cont'd)

Name	Assignment	Position
Mr. S. Tokieda	Harbour traffic control (plan)	Japan Association for Preventing Marine Accidents
Mr. M. Danno	Economic evaluation	Yachiyo Engineering Co., Ltd.

Table 6.1.4 Advisory Committee Members Dispatched
(Phase I; Oct.-Nov., 1987)

Name	Position
Mr. T. Ozawa	Committee Chairman Director of Rescue Division, Guard & Rescue (G & R) Dept. Maritime Safety Agency (MSA)
Mr. Y. Hayafune	Special Assistant to the Director Rescue Division, G & R Dept., MSA
Mr. M. Yokoyama	Special Assistant to the Director Communications Management Div, Equipment & Technology (E & T) Dept., MSA
Mr. A. Kobayashi	Special Assistant to the Director Navigation Safety Division, G & R Dept., MSA
Mr. T. Toyokura	Administration Division, G & R Dept., MSA
Mr. S. Teramoto	Assistant Professor Maritime Safety Academy
Project Coordinator:	
Mr. S. Matsu-ura	Deputy Head, Social Development Cooperation Dept., Japan International Cooperation Agency

Table 6.1.5 Advisory Committee Members Dispatched
(Phase II; Jul.-Dec. 1988)

Name	Position
Mr. H. Kawabata	Chairman Director of Rescue Division G & R Dept., MSA
Mr. T. Suzuki	Deputy Director, Rescue Div. G & R Dept., MSA
Mr. S. Teramoto	Professor of Maritime Safety Academy
Mr. M. Yokoyama	Deputy Director, Comm. Div. E & T Dept., MSA
Mr. Y. Hayafune	Hydrographic Dept., MSA
Mr. A. Kobayashi	Special Assistant to the Director Navigation Safety Division, G & R Dept., MSA
Project Coordinator:	
Mr. S. Matsu-ura	Japan International Cooperation Agency

6.2 Indonesian Counterpart Personnel

Indonesian Counterpart Personnel are listed in Table 6.2.1 and Table 6.2.2.

Table 6.2.1 Indonesian Counterpart Personnel
(Phase I; Oct.-Nov., 1987)

Name	Position
Captain H.M.J. Lumentah	Directorate of KPLP
Mr. Ch. Paath	Directorate of Navigation
Capt. Albert Lapian	Directorate of KPLP
Capt. Conrad Siahaan	Directorate of KPLP
Mrs. Juliana, S.H.	Directorate of KPLP
Mr. W.H. Simorangkir	Directorate of KPLP
Mr. Hartono	Directorate of KPLP
Capt. Ronny Beaupain	Directorate of Shipping and Marine Safety
Mr. Judistar	Personnel Division
Drs. J. Soepardi	Personnel Division
Mr. Triyuswoyo	Education & Training Center

Table 6.2.2 Indonesian Counterpart Personnel
(Phase II; Jul.-Dec., 1988)

	Name	Assignment
	Soenardyo (DIR. KPLP)	Chief of Counterpart Group
1.	* H. Nelwan (DIT. KPLP)	Introduction, Socio-economic
2.	Drs. Hamid Hasan (DIT. KPLP)	study, Maritime Activities
3.	Soenoro (DIT. KPLP)	and Marine Accidents
4.	Drs. Wahyudi (BAG. UMUM)	
5.	Morton Panggabean (DIT. LALA)	
6.	Drs. H. Pangaribuan (DIT. KPLP)	
1.	* Capt. H. M. J. Lumentah (KPLP)	Maritime Safety and Search
2.	Saman Abdullah (JASMAR)	and Rescue
3.	A. Said (KPLP)	
4.	Kol. Manurung (BASARNAS)	
5.	Soemadi (BASARNAS)	
1.	* Muhdin Sslim S. H. (HUKUM)	Prevention of Marine
2.	Drs. C. Soetikno (KPLP)	Disasters
3.	Madiono (KPLP)	
4.	W. H. Simorangkir (KPLP)	
1.	* CH. Paath (NAVIGASI)	Maritime Safety and SAR
2.	Hartono (KPLP)	Communications and
3.	Syamsu Wijaya (NAVIGASI)	Information System
4.	Ir. Wahyudi (KPLP)	
1.	* R. Beaupain (DITKAPPEL)	Harbour Traffic Control
2.	S. Djunaid (PELPENG)	System
3.	Soeharyanto (DITKAPPEL)	
1.	* Capt. I. Sinambela (PUSDIKLAT)	Education and Training System
2.	Yudistar (KEPEGAWAIAN)	for Maritime Safety and SAR
3.	Edison Simanjuntak (KPLP)	Personnel
1.	* Dewata (NAVIGASI)	Organizational System
2.	Hotman Pangaribuan (PERENCANAAN)	
3.	Drs. J. Soepardi (KEPEGAWAIAN)	
4.	Drs. Eko Hadi Rumekso (KEPEGAWAIAN)	
1.	* H. Supit (KPLP)	Cost Estimate, Development
2.	Adolf Richard T. (PERENCANAAN)	Plan and Selection of
3.	J. Palambang (PUSDIKLAT)	Priority Projects
4.	Drs. Syamsuddin Riyadi (ARMADA KPLP)	
5.	Israhadi B. P. (KPLP)	
6.	Drs. Haryanto (KPLP)	
7.	Nugroho (KPLP)	

* Group leader

JICA