Indonesia

Maritime Telecommunication System Development Project (3)

Report Date: March 2001
Field Survey: August 2000

1. Project Profile and Japan's ODA Loan

Location Map of the Project Area

Equipment procured for Class 1 Radio Station in Jakarta
Left: Short/medium wave transmitter, Middle: Microwave transmitter, Right: Microwave tower

(1) Background

Indonesia had a total of 206 radio stations ranging from class 1 to class 4 stations (at the time of appraisal). These stations were responsible for providing information on navigational safety, weather and harbors as well as maritime telecommunication services such as public communication and rescue communication[1]. Between 1969 and 1990 Japan's ODA loans have been provided to repair and replace deteriorating equipment and facilities, focusing mainly on class 1 and class 2 stations. Previous projects such as Phase I and Phase II of the Maritime Telecommunication System Project were conducted during this period. Based on revision to the SOLAS Convention (International Convention for the Safety of Life at Sea, enacted in 1974) adopted by International Maritime Organization (IMO) in November 1988, the execution of the GMDSS[2] (Global Maritime Distress and Safety System) started from 1992 and it was obligated to use GMDSS-compatible communications equipment. The GMDSS was scheduled to implement from 1992 by stages, but some ships had been in operation since 1992 already outfitted with all of the required equipment. This had resulted in a pressing need to establish a receiving system among the coastal radio stations and prepare a system that can immediately respond to maritime emergencies and rescue activities.

Improvements to class 3 and 4 stations had lagged well behind improvements for the class 1 and 2 stations, and in some cases service had been hampered by the deteriorating communications equipment. This had been especially true for the less developed Eastern Indonesia. Here the delays in improving class 3 and 4

---

1 Coastal radio stations are classified into four classes based on the coastal region they oversee, their importance to the harbors and the nature of the services they provide. Class 1 coastal radio stations provide all of the requested services, while class 2 to 4 stations provide portions of these services.

2 GMDSS (Global Maritime Distress and Safety System) is a communications system to provide assistance in maritime rescue efforts, insure safe sea travel and protect lives. Regulations for the system are based on international agreements (SOLAS Convention). Thanks to this system a distress signal from a ship anywhere in the ocean can be accurately received by a land-based rescue organization and nearby ships, and then effective communication is possible through a single network consisting of the land-based rescue organization and the ships at sea. In addition to distress, emergency and safety broadcasts, this system can also provide maritime safety information such as ship warnings and weather reports.

stations had become apparent and the necessity for improving these stations had become a pressing issue. A law enacted in 1983 required that small vessel be equipped with radio equipment. However, small- and light-type low output equipments were the most typical ones in general and the communication range was fairly limited. Therefore, it had become necessary to improve and expand the class 3 and 4 stations to fill the gaps of service areas for the class 1 and 2 stations, in order to establish a communications network that could provide adequate communication services, even for these smaller ships.

(2) Objectives

In view of the importance of maritime transport for Indonesia as an archipelago, this project was to provide the high-quality and reliable coastal radio services by improving and expanding the equipment at its coastal radio stations, including the introduction of communications equipment based on GMDSS technological standards, and thereby to secure safety of vessels in the waters surrounding the nation and bolster the system for handling distress calls.

(3) Project Scope

This project covered the following improvements of equipment to be used by coastal radio stations and vessels belonging to the Marine Transport Bureau, Directorate General of Sea Communication. The Japan's ODA loan (the "ODA loan") covered ¥4,057 million, or 85% of the total project costs of ¥4,773 million (foreign currency portion: ¥3,929 million, local currency portion: ¥844 million).

1) Improvement and Expansion of Equipment for GMDSS[3]

i) Install DSC facilities (Digital Selective Calling) to eight class 1 stations
ii) Install NBDP facilities (Narrow Band Direct Printing Telegraph) to four class 1 stations
iii) Install DSC and NBDP facilities to 11 large vessels belonging to Navigation Section of the Directorate General of Marine Transport
iv) Install NAVTEX facilities (Navigation Telex) to three class 1 stations and one class 2 station.

2) Improvements for Class 2 Stations

i) Transfer existing DSC facilities from four class 1 stations to four class 2 stations
ii) Install two class 2 stations with short and -mid-wave transmitters, VHF equipment and antennas

[3] The main equipment for handling GMDSS are (1) DSC (Digital Selective Calling), (2) NBDP (Narrow Band Direct Printing Telegraph) and (3) NAVTEX (Navigation Telex). DSC is a digital calling system that uses MF, HF and VFF band frequencies to call ships and coastal radio stations. This system can handle distress, safety and other safety related calls, as well as normal communication. When the station receives a DSC call, there is an audible and visible alarm and the address, station identification and DSC report can be displayed and printed. DCS frequencies are regulated separately by distress, safety and other applications. In the case of a distress call, a crew member only needs to press the distress button on the ship's station and the call type, auto identification, distress type, distress location, time and proceeding communications method are all sent to the coastal radio station. After the contact communication (distress, emergency or safety) has been completed by DSC, communication by NBDP or wireless telephone is possible by simply selecting the communications mode. NBDP is a Telex communication method using mid and short wave frequencies that allow for automatic direct printing, and has been used in place of manual Morse code communications. NBDP can directly connect general subscribers and ship stations through the coastal stations. In the case of a distress signal, the signal sent from the vessel can be automatically sent from the coastal station to a rescue agency like the Maritime Safety Agency. NAVTEX is an international direct printing communication service that can send ship warnings, weather reports, and other emergency maritime safety information to ships up to 400 nautical miles from the coastal station.

3) Improvements of Class 3 and 4 Stations

i) Install ten class 3 stations with antenna equipment, VHF equipment and emergency power sources

ii) Install five class 4 stations with antenna equipment, VHF equipment and emergency power sources

4) Expansion of VHF Operations in Jakarta Station

Improve the reception functions of this station, which conventionally has functioned mainly as a transmitter.

Figure 1 Location Map of Class 1 to Class 4 Stations to be Improved and Expanded by the Project

5) Implementation of Training

i) Training of general communications equipment at the factory (equipment maintenance training at the factory for the purchaser of the equipment)

ii) OJT of general communications equipment (OJT training in Indonesia regarding equipment operation and maintenance)

iii) Training of GMDSS-related equipment at the factory (equipment maintenance training at the factory for the purchaser of the GMDSS equipment)

iv) OJT of GMDSS-related equipment (OJT training in Indonesia regarding GMDSS-related equipment operation and maintenance, as well as OJT training for acquiring qualifications of video operators)

6) Consulting Services

Consultants are employed to perform the following so that the project could be smoothly and efficiently executed.

i) Preparations for implementing the project

ii) Testing in attendance at the factory

iii) Supervision of equipment installation

iv) Technology transfers

(4) Borrower/Executing Agency

The Republic of Indonesia / Directorate General of Sea Communication (DGSC)

(5) Outline of Loan Agreement

Loan Amount/Loan Disbursed Amount	¥4,057 million / ¥4,002 million
Exchange of Notes/Loan Agreement	September 1991 / September 1991
Terms and Conditions	Interest rate: 2.6%, Repayment period: 30 years (10 years for grace period), General Untied (Partially untied for consulting services)
Final Disbursement Date	October 1997

2. Results and Evaluation

(1) Relevance

This project has a very high priority for Indonesia's maritime sector, including response to GMDSS standards, and the relevance of objective for the project is still maintained from the standpoint of securing safety and improving distress signal capabilities for navigation in the nation's territorial waters. There were no particular changes with the scope of the project, except consulting services had to be added as the level of technical skill needed to transfer the digital communications and the communications equipment was higher than had been originally expected.

(2) Efficiency

This project was executed by the Directorate of Navigation under the control of Directorate General of Sea Communication. The implementation schedule was extended by a year and half due to the addition of the consulting services and the time required for bidding procedures for equipment procurement and consulting. In terms of the project costs, a rise in the local-currency portion was offset by a drop in the foreign-currency portion, and thus overall costs remained within the projected budget.

(3) Effectiveness

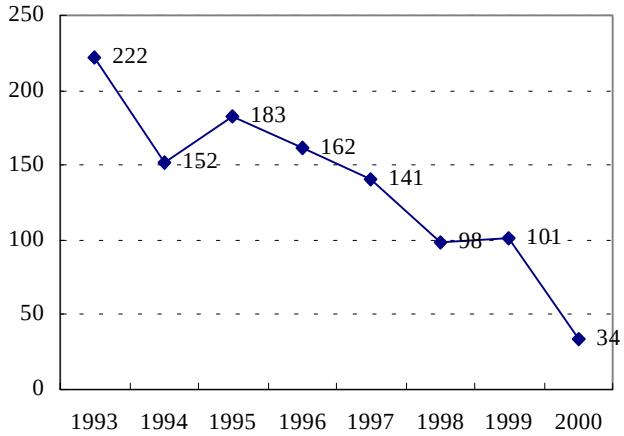
This project aimed to improve maritime safety and bolster the distress signal system for Indonesia by improving coastal radio stations and expanding the maritime radio communications network. At the time of the appraisal it was difficult to quantitatively understand what effects would be brought about by this project. However, the project effects can be reviewed here by looking at the changes in the number of maritime accidents in Indonesia. The package of staff training is included in the project scope, and this implementation status will also be reviewed.

1) Changes in Number of Maritime Accidents

Figure 2 shows the number of maritime accidents around Indonesia from 1993 to the end of August 2000. The number of accidents was in a downward trend from 1992 to 1997 of project completion year, the period in which the project was helping to improve coastal radio stations compatible with GMDSS. In 1998, the first year after completion of the project, the number of accidents fell to around 100. The number fell below the 100-mark, all the way down to only 34 accidents as of end of August, 2000.

Figure 2 Changes in Number of Maritime Accidents (accidents/year)

※Data provided by the Directorate General of Sea Communication, Directorate of Navigation



It is believed that this project greatly contributed to the reduction in accidents by improving the coastal radio system and providing weather, harbor and other information to seafarers.

2) Staff Training

Table 1 shows the plan and actual results for the staff training program conducted within the Directorate of Navigation from 1994 to 2000. The basic policy of the Directorate was to conduct regular training every year for both radio operators and technicians. In 1994 training was conducted one time for 30 radio operators and one time for 20 technicians, according to plan and with a budget provided by the central government. Training in 1995 and 1996 was implemented through this project. A total of 65 people received training at overseas factories in 1995; 30 at a factory in Denmark and 35 at a factory in Japan. In 1996 training was provided to 30 employees in Indonesia.

Table 1 Employee Training of Directorate of Navigation: Plan and Actual Results

Indicator		**1994**	**1995** (through this project)	**1996** (through this project)	**1997** Project Completed	**1998**	**1999**	**2000**
No. of Training Programs (programs/year)	Plan	2	3	1	2	2	2	2
	Actual	2	3	1	1	0	0	0
No. of trainees (persons)	Plan	50	65	30	60	60	60	60
	Actual	50	65	30	30	0	0	0

The training programs returned to the system using funds from the central government following completion of the project in 1997. However, the currency crisis of 1997 presented the Indonesian government with many financial obstacles and as a result the training was not conducted at all from 1998. This situation should be at issue, as it may become harder to maintain and improve staff skill levels.

(4) Impact

1) Environmental Impact

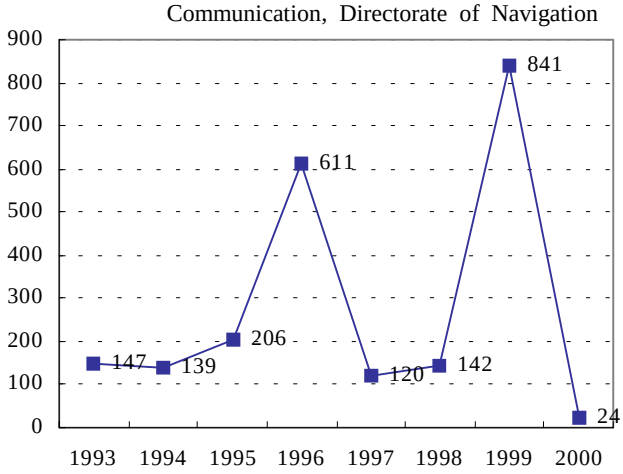
This project did not result in any negative impacts on the environment.

2) Changes in Number of Deaths from Maritime Accidents

Figure 3 shows the number of deaths resulting from maritime accidents between 1993 and 2000. Even though the number of accidents has been decreasing, as mentioned earlier, there was no noticeable pattern in regards to the number of deaths.

Figure 3 Changes in Number of Deaths from Maritime Accidents (person/year)

※Data provided by the Directorate General of Sea Communication, Directorate of Navigation



Improving coastal radio system that meets GMDSS standards has greatly promoted efficiency for sending and receiving distress signals in the open sea. As a result, there has been a decrease in the number of maritime accidents. However, in 1996 and in 1999 there were accidents involving large passenger ships and a large loss of life. This indicates that the smaller number of maritime accidents did not necessarily translate into fewer deaths.[4]

It is hoped that Indonesia will work to improve and strengthen a maritime rescue system in line with the efficiency of the coastal communications system that has been greatly improved by this project.

(5) Sustainability

1) Operation and Maintenance

The coastal radio stations are operated and maintained by the Directorate General of Sea Communication, Directorate of Navigation for nine local jurisdictions across the country. The Directorate has 700 staff members nationwide involved in these operations (see Table 2). According to the executing agency, the numbers of staff are adequate, but annual training for radio operators and technicians has not been conducted since 1997, as mentioned earlier, and thus there are some concerns and dissatisfaction in this regard. The Directorate realizes that a high degree of technical expertise and knowledge are required to operate advanced systems such as GMDSS, which uses satellite communications system, and thus wants to increase training opportunities.

Table 2 No. of Employees for Operating and Maintaining Coastal Radio Stations

	1990	1995	1996	1997	2000
No. of O&M Employees	675	707	706	735	704

※Data provided by the Directorate General of Sea Communication, Directorate of Navigation

[4] According to the Directorate of Navigation, there was a major accident in February 1999 (approx. 300 died) and another in October of the same year (approx. 400 died). However, data for 1996 was not available.

2) Status of Procured Equipment

On August 22, 2000 an post evaluation team visited the class 1 radio station in Ancol Jakarta. This station (transmitter) was equipped in 1987 as part of phase 1 of a previous ODA project. This station functions as coastal radio relay station along with the Begasi receiving station in the eastern section of Jakarta.

Through this project, the Jakarta class 1 station was equipped with GMDSS communication training equipment, short / mid-wave transmitters and ultra-short-wave radio equipment. All of this equipment has been kept in good condition. However, the GMDSS training equipment is not being put to full use, as the study and training programs have not been conducted between 1998 and 2000 due to the shortage of budget following the currency crisis of 1997.

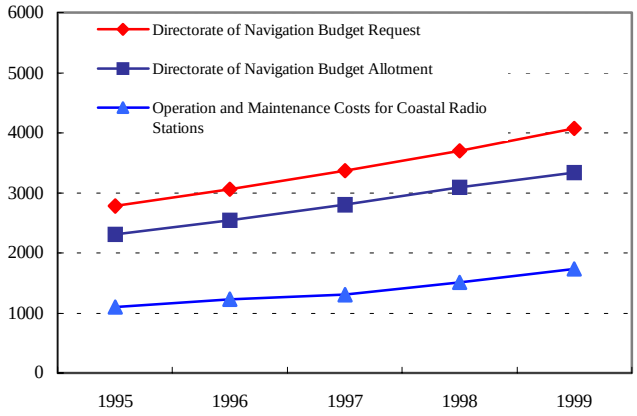


Figure 4 Budgetary Status for Operation and Maintenance Agency (million rupees)

※Data provided by the Directorate General of Sea Communication, Directorate of Navigation

3) Sustainability

One of the objectives of this project was to strengthen Indonesia's system for providing navigational information and to effectively receive distress signals. It was inferred that the effects of this program have been seen in the drop in the number of maritime accidents. Providing ship navigators with weather and harbor information helps to promote a better awareness of accident prevention, which has led to a decrease in the number of maritime accidents.

The two main points to consider in regards to the sustainability of the project effects are (1) can the spare parts for maintaining the introductory equipment be adequately procured, and (2) does the related staff have the necessary level of knowledge and technical skill. However, the Directorate of Navigation, the agency in charge of operating and maintaining the equipment, has said that it has been difficult to satisfy both of these points due to insufficient funding from the central government.

Figure 4 shows the budget requested by the Directorate of Navigation, the actual amount allotted and the operation and maintenance costs for coastal radio stations. Each year the Directorate as a whole receives about 80% of the requested amount, which is a reasonably generous allotment considering the financial difficulties facing the central government. Roughly half of the funds allotted to the Directorate are earmarked for the operation and maintenance of the coastal radio stations. However, the head of the Directorate said that this is not enough to cover spare parts, and the study and training of personnel.

The maintenance costs for equipment such as communications equipment, which can quickly experience deteriorating functions, are not the same each year. In fact, these expenses can increase or decrease sharply depending on what parts need to be replaced. Therefore, the concept of "preventative maintenance" must be incorporated in order to conduct planned maintenance. In other words a mid- and long-term maintenance plan for equipment and facilities must be established and reflected in the budget. This point is understood by the Directorate of Navigation and Japan International Cooperation Agency (JICA) experts have currently been invited to the coastal radio station in Jakarta for the Directorate to learn actual methods for practicing this concept of "preventative maintenance". The Directorate of Navigation needs to understand the expertise surrounding preventative maintenance, prepare a budget based on this concept and insure that

spare parts can be obtained. This is very important for guaranteeing the sustainability of this project. With satellite digital communication technologies becoming more standardized, it is indispensable to provide repeated study and training to the staff and it is hoped that more training opportunities will be made available.

A lighthouse tax system was introduced in 2000 and some of these revenues will go to the maintenance of coastal radio stations. It is expected that this will help raise project sustainability.

Comparison of Original and Actual Results

Item	Plan	Actual
① Project Scope		
1. Procurement and installation of radio communication equipment		
・1 Class stations	8 stations Jakarta, Dumai, Bitung, Ambon, Jayapura, Bireun, Surabaya, Ujung Pandang,	Same as left
・2 Class stations	4 stations Kupang, Semarang, Sorong, Balikpapan	Same as left
・3 Class stations	10 stations Pontianak, Donggala, , Kendari, Ternate, Batu Ampar, Benua, Dili, Tarakan	Same as left Only changed Donggala to Pantloan
・4 Class stations	5 stations Lenbar, Tafuna, Sanana, Manokwari, Fakffak	Same as left
・Communications equipment for vessels	11 vessels	Same as left
2. Consulting service	Foreign consultant: 69M/M Local consultant: 138M/M	Foreign consultant: 132M/M Local consultant: 211M/M
・Detailed design/bidding assistance	Foreign: 17M/M, Local: 34M/M	Foreign: 42M/M, Local: 80M/M Foreign: 33M/M, Local: 41M/M
・Evaluation of biddings, contract negotiations	Foreign: 12M/M, Local: 24M/M	Foreign: 5M/M, Local: 0.3M/M
・Inspection of equipment plans and installation	Factory inspection is done all at once	Foreign: 51M/M, Local: 90M/M
・Factory training, delivery inspection	Foreign: 40M/M, Local: 80M/M	
② Implementation Schedule		
1. Exchange of Notes	Sep. 1991	Sep. 1991
2. Approval of short list for consultants	Oct. 1991	Apr. 1992, Dec. 1996
3. Approval of results for selecting consultants	Jan. 1992	Oct. 1992, Feb. 1997
4. Conclusion of contracts with consultants	Apr. 1992	Feb. 1993, May 1997
5. Field study, preparation of bidding documents	Jan. 1993	Feb. 1993 ~ Feb. 1997
6. Public announcement of biddings	Jan. 1993	Aug. 1994, Feb. 1997
7. Inspection of biddings, contract negotiations, approval	Apr. 1993 ~ Sep. 1993	Oct. 1994 ~ Jul. 1995
8. Manufacturing of equipment	Nov. 1993 ~ Feb. 1995	Apr. 1995 ~ Aug. 1997
9. Factory training	Mar. 1994 ~ Apr. 1994	Oct. 1995 ~ Dec. 1995
10. Factory inspection	Jul. 1994 ~ Feb. 1995	Sep. 1995 ~ Sep. 1997
11. Equipment installation, delivery inspection	Oct. 1994 ~ Mar. 1996	Jan. 1996 ~ Sep. 1997
③Project Cost		
Foreign currency	¥3,929 million	¥3,339 million
Local currency	¥844 million	¥1,353 million
Total	¥4,773 million	¥4,692 million
ODA loan portion	¥4,057 million	¥4,002 million
Exchange rate	1Rp.＝¥0.068 (Apr. 1991)	1Rp.＝¥0.045 (Mar. 1996)