Republic of Indonesia

Ex-Post Evaluation of Japanese ODA Loan Project

"Maritime Telecommunication System Development Project (IV)"

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0. Summary

The project aimed to fulfill the requirement of 1974 Safety of Life at Sea Convention[1] (hereinafter referred as "SOLAS") to secure the safety of maritime navigation, and to respond promptly to maritime accidents by facilitating Global Maritime Distress and Safety System[2] (hereinafter referred to as "GMDSS") and Automatic Identification System[3] (hereinafter referred to as "AIS") at 33 and 4 Coastal Radio Stations (hereinafter referred to as "CRS") respectively in Indonesia. The project is well consistent with the development policy and development needs of Indonesia, as well as with the Japan's ODA policy; thus, the relevance of the project is high. The operation/effect indicator that targeting 24 hours of operation hours of GMDSS at newly installed stations by the project has been achieved at almost all target CRS. Moreover, the project expanded the coverage areas of maritime communication of GMDSS and contributed to the Indonesia's obligation to fulfill the requirement of SOLAS Convention. A beneficiary survey confirmed that the benefits of the project (improvement of navigation safety, increase of access to weather and navigation information, and acceleration of emergency distress response) were recognized by the GMDSS users. Furthermore, the project contributed to the service of CRS as well as the promotion of maritime business. However, the training center and the comprehensive maintenance center were not utilized after the completion of the project and the effectiveness produced by these two centers were limited; thus, the project's effectiveness and impact are fair. The project efficiency is fair because the project period exceeded the plan although the project cost was within the plan. In regard to operation and maintenance, no major problems have been observed. However, there is room for improvement on the operation of the two centers mentioned above, as well as institutional and technical aspects; thus, sustainability of the project is fair.

In light of the above, the project is evaluated to be partially satisfactory.

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[1] SOLAS Convention (Safety of Life at Sea Convention) is an international maritime safety treaty.

[2] GMDSS (Global Maritime Distress and Safety System) is a communications system for maritime rescue and safe navigation based on the regulation of international convention (SOLAS convention) which aims to contribute to secure the safety of life. Upon occurrence of the maritime accident, the radio operator of the ships used to send an SOS call and request for rescue. However, GMDSS enables to request rescue immediately and reliably to search and rescue organizations and ships nearby when ships had accidents at any of sea areas utilizing satellite and digital communication facilities. In addition, the information of navigation provided from onshore could be obtainable by automatic receptive system.

[3] AIS (Automatic Identification System) is automatic tracking system for identifying static, dynamic and voyage-related information such as vessel identifications, kinds, position, speed, course and status of vessels.

1. Project Description

Project Location

GMDSS Monitoring Room
(Palembang Coastal Radio Station)

1.1 Background

Indonesian waters are a strategic point for maritime traffic connecting East Asia with Europe and the Middle East (an average of more than 300 ships daily pass through four sea lanes), but an average of 204 (1982–2000) shipping accidents, and 103 (2002) incidents of piracy, take place per year. Meanwhile, in its 1988 revision, SOLAS Convention obliged the signatory nations to ensure that shipping using international sea lanes and onshore telecommunications stations conform with the GMDSS by February 1999. In addition, the 2002 revision obliged ships using international sea lanes to install AIS by December 2004.

In view of these circumstances and its obligations to the international community, the Indonesian government has been promoting the development of maritime telecommunications stations to establish safety at sea. As part of this, Japan International Cooperation Agency (hereinafter referred to "JICA") had disbursed ODA loans for the Maritime Telecommunications System Development Project since 1981. However, there were still many stations which were not equipped with receiving Digital Selective Calling (DSC) function, especially at 3rd and 4th class stations. In addition, even stations where improvement was realized by the previous projects, the equipment has become decrepit. Accordingly, there was an urgent need to expand the coverage to receive DSC by equipping GMDSS system and to improve CRS in order to establish safety at sea.

1.2 Project Outline

The objectives of the project are to meet the requirement of the SOLAS convention, to secure the navigation safety of ships navigating in Indonesian territorial sea, and to expedite

the response to maritime accidents by installing GMDSS (at 33 coastal radio stations) and AIS (at 4 coastal radio stations), thereby contributing to the promotion of the maritime business.

Loan Approved Amount/ Disbursed Amount	5,567 million yen / 5,382 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	March 2004 / March 2004
Terms and Conditions	Interest Rate: 1.3 % Repayment Period: 30 years (Grace Period: 10 years) Condition for Procurement: General Untied
Borrower/ Executing Agency(ies)	The Government of Indonesia / Directorate General of Sea Transportation (DGST), Ministry of Transportation
Final Disbursement Date	September 2012
Main Contractor (Over 1 billion yen)	Japan Radio Co., Ltd (Japan) / Toyota Tsusho Corporation (JV) (Japan)
Main Consultant (Over 100 million yen)	Consortium of three companies: Japan Telecommunications Engineering and Consulting Service (JTEC) (Japan) / Pantel International Co., Ltd. (Japan) / P.T. KONSTEL NUSANTARA (Indonesia)
Feasibility Studies, etc.	・Development Study “Study for the Maritime Traffic Safety System Development Plan” (March 2001)
Related Projects	＜Yen Loan Project (L/A date)＞ ・ Marine and Coastal Radio Communication Project (January 1969, May 1970, August 1971, May 1972, and December 1973) ・ Maritime Telecommunication System Development (I) (September 1981) ・ Maritime Telecommunication System Development (II) (February 1985) ・ Maritime Telecommunication System Development (III) (September 1991) ・ Equipment Supply for Medium Wave Radio Boacon Stations (October 1983) ・ Maritime SAR Telecommunications System Project (June 1984) ・ Disaster Prevention Ships Procurement Project (December 1995) ＜Technical Cooperation Project＞ ・ Dispatch of Expert to DGST on “Maritime Safety

	System" (May 2008 – May 2011) ・ Project on BAKOMKAMLA (Indonesian maritime Security Coordination Body) Structural Enhancement (May 2008 – May 2011) ・ Senior Volunteer on "Maritime Telecommunication System" (two terms since 2000) ＜Grant Aid (E/N Date)＞ ・ Project for enhancement of Vessel Traffic System in Malacca and Singapore Straits (November 2008) ・ Project for Construction of Patrol Vessels for the Prevention of Piracy, Maritime Terrorism and Proliferation of Weapons (June 2006) ・ Project for enhancement of Vessel Traffic System in Malacca and Singapore Straits (Phase 2) (October 2010) ＜Other donors and International Organization＞ ・ Basic Training and Introduction of VTS by Singapore, Australia, Denmark, Norway, International Maritime Organization (IMO), and China.

2. Outline of the Evaluation Study

2.1 External Evaluator

Keiko Watanabe, Mitsubishi UFJ Research & Consulting Co., Ltd.

2.2 Duration of Evaluation Study

Duration of ex-post evaluation study was conducted as follows;

Duration of the Study: September 2014 – July 2015

Duration of the Field Survey: November 26 – December 23, 2014, March 7 – March 21, 2015

2.3 Constraints during the Evaluation Study

Under the limited time and budget of the study while most of the target CRS of the project were located in remote areas, only 5 target stations, namely, Jakarta, Surabaya, Palembang, Kalianget and Cilacap, were visited for this study instead of all 33 stations. Besides, the results of questionnaires were collected limitedly, however, information was complemented by conducting telephone and mail interviews, and collecting data from the executing agency. Furthermore, the sample size of beneficiaries collected during the beneficiary survey was limited because the number of ships equipped with GMDSS was lower than expected at the survey ports. Besides, the survey at the port had to be conducted under some restriction.

3. Results of the Evaluation (Overall Rating: C[4])

3.1 Relevance (Rating: ③[5])

3.1.1 Relevance to the Development Plan of Indonesia

As a member state of International Maritime Organization[6] (hereinafter referred to as "IMO"), the government of Indonesia is liable for compliance with the SOLAS Convention. SOLAS Convention after the amendment in 1988 required member countries to introduce GMDSS to vessels of 300GT[7] and upwards as well as all passenger ships by February 1999. Directorate General of Sea Transportation (hereinafter referred to as "DGST") extended the deadline up to February 2009 to obligate to install GMDSS to domestic passenger ships as well in order to enforce the installment of the domestic ships. Therefore, the expansion of GMDSS coastal-based facilities covering whole area of Indonesian territorial sea should be completed urgently before 2009.

Furthermore, the revised SOLAS Convention in 2002 required ships engaged on international voyages to fit with AIS by December 2007. The Government of Indonesia recognized the SOLAS obligation to introduce GMDSS and AIS as essential base for maritime security for Indonesia as well as international society.

At the time of the ex-post evaluation, Indonesia, as a signatory state of SOLAS Convention, is still responsible for implementing the convention including operation of GMDSS and AIS. Moreover, the new Indonesian administration since October 2014 launched "maritime doctrine" highlighting importance of maritime security and safety.

3.1.2 Relevance to the Development Needs of Indonesia

In order to fulfill SOLAS Convention, the Government of Indonesia has promoted GMDSS facilities at CRS; as a result, the coverage of GMDSS network in the Indonesian territorial sea expanded up to about 60%. However, there was an urgent need to cover the rest of areas, in particular, A1 sea areas[8] where VHF communications could not be received. In addition, there was a need to upgrade existing aging facilities since some installed equipment has reached the lifetime and some equipment whose spare parts were no longer produced by the manufacturers.

Indonesian waters are a strategic point for maritime traffic connecting East Asia with

[4] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory
[5] ③: High, ②: Fair, ①: Low
[6] Indonesia joined in IMO in 1961 (at that time it was Inter-governmental Maritime Consultative Organization (IMCO)).
[7] GT: Gross Tonnage
[8] Sea areas are classified from A1 to A4 depending on the distance from the coast. Each sea area has different communication system depending on the 1) distance from the coast, and 2) frequency as follows; A1: 1) about 25 nautical miles, 2) VHF (Very High Frequency), A2: about 150 nautical miles, 2) MF (Medium Frequency), A3: 1) Effective coverage where static communication satellite can transmit except A1 and A2 sea areas, 2) HF (High Frequency) and Inmarsat, A4: 1) Sea areas except A1, A2 and A3 sea areas, 2) HF.

Europe and the Middle East, but an average of 204 (1982–2000) shipping accidents, and 103 (2002) incidents of piracy, take place per year. At the time of the ex-post evaluation, shipping accidents reduced to an average of 29 (2008-2013) although the number varied in year. However, incidence of piracy and armed robbery against ships including actual and attempted attacks has still high figures as 106 in 2013. Therefore, there is still high need to establish security measures for navigation safety.

3.1.3 Relevance to Japan's ODA Policy

According to the appraisal reports, JICA prepared the "Mid-Term Strategy for Overseas Economic Cooperation Operations" in April 2002, based on the Japan's assistance policy to Indonesia. In this document, "infrastructure development for economic growth" was put as one of priority areas and "economic infrastructure development" was promoted as country specific assistance to Indonesia. In addition, assistance in improvement of the logistics for sustainable economic growth was listed in the "Country Assistance Strategy for Indonesia" (October 2003). In regard to the distribution of goods by sea, JICA has been contributed to securing the safety of maritime traffic by facilitating maritime telecommunication system since 1980's. This project enabling to ensure maritime safety in the world's pre-eminent piracy-prone areas including four sea lanes of Indonesia contributes directly to the economic growth of Indonesia. Since many Japanese vessels have been subjected to attacks by the pirates in these areas, it was expected to contribute to the stabilization of the Japanese economic activities.

3.1.4 Appropriateness of Project Plan and Approach

As stated below in the "effectiveness" and "sustainability", the comprehensive maintenance center and the training center which were established by the project have not been utilized after the completion of the project. Both centers were considered to be established from the lessons learned of the previous projects, which included the establishment of a centralized maintenance function from the view of efficiency and the increase of training opportunity for smooth operation of the equipment which was provided by the project. Therefore, the idea of setting up the two centers was relevant to meet demands. However, as stated in 3.3.1 and 3.5.1, the utilization of these two centers was constrained by the operational and financial regulations. Therefore, some problems were identified in the appropriateness of the project approach which did not consider these regulations fully in the project design.

Although these two centers were not operational after the project completion, as stated later, it was confirmed at the time of the ex-post evaluation that a certain level of effectiveness had been produced during the project period and equipment provided for these centers were kept reasonably in terms of sustainability. Furthermore, judging from the portion of total cost of

the project, this problem did not seriously hamper the objective of the project.

This project has been highly relevant to the country's development plan and development needs, as well as Japan's ODA policy. Therefore, its relevance is high.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

Comparison of planned and actual project outputs is summarized in Table 1. The project location map which indicates 33 newly installed GMDSS coastal radio stations is in Figure 1.

Table 1: Comparison of Planned and Actual Project Outputs

		Planned	Actual
1. Installation of GMDSS			
1-□ Installation of MF/DSC for Sea Area A2	Class *1	**Total 19 CRS**	**Total 22 CRS**
	1st	Palembang (1)	3 CRS (Semarang, Ambon, Jayapura) were added (4)
	2nd	Sabang, Teluk Bayur, Banjarmasin (3)	As planned
	3rd	Samarinda, Bau-bau (2)	As planned
	4th	Tapak-tuan, Natuna, Pangkal Balam, Bengkulu, Ende, Bima, Ketapang, Sampit, Poso, Toli-toli, Tual, Saumlaki, Agats (13)	As planned*2
1-② Installation of VHF/DSC for Sea Area A1	Class	**Total 33 CRS**	**Total 33 CRS**
	1st	Palembang (1)	As planned
	2nd	Sabang, Teluk Bayur, Banjarmasin (3)	As planned
	3rd	Tanjung Ubang, Jambi, Tegal, Samarinda, Bau-bau (5)	As planned
	4th	Tapak-tuan, Lhokseumawe, Kuala Tanjung, Kuala Enok, Natuna, Pangkal Balam, Muntok, Bengkulu, Manado, Kalianget, Meneg, Bima, Ende, Maumere, Ketapang, Sampit, Kumai, Batulicin, Pare-pare, Poso, Toli-toli, Saumlaki, Tual, Agats (24)	As planned*3 * The name of Kuala Enok station changed into Kuala Tungkal since the location moved, but the station covers same sea areas.
2. Improvement of CRS for enabling to cover GMDSS	1) Separation of transmitting and receiving stations (Between Teluk Bayur and Benoa)		As planned
	2) Improvement of environment for Surabaya and Makassar stations		As planned
	3) Improvement of VHF coverage areas for Dumai and Samarinda stations.		As planned. For Samarinda, new station was constructed at different location to improve the coverage areas.
	4) Replacement of aged engine-generators at 1st and 2nd class stations. (total of 14 stations)		As planned.
	5) Replacement of aged antennas at 1st and 2nd class stations (total of 12 stations)		As planned

	6） Additional works	・ Tower for Dumai station were strengthened. ・ Modified the tower design for Ende and Maumere stations. ・ Additionally purchased Antenna for NAVTEX for Jakarta station.
3. Commencement of National NAVTEX*4	Four (4) stations from Jakarta, Makassar, Ambon and Jayapura, where international NAVTEX has been implemented.	Same four (4) stations were implemented. However, after preparation of the detailed design, IMO instructed member countries not to use same international NAVTEX frequency for the national NAVTEX. Therefore, additional equipment which can change frequency automatically were procured.
4. Installation of AIS	Belawan, Dumai, Sabang, Jakarta (4)	Four (4) stations were implemented, but instead of Belawan and Jakarta stations, Lhokseumawe and Cilacap were implemented.
5. Establishment of Comprehensive Maintenance Center	Establish at Jakarta station 1) Provision of spare parts for GMDSS to the GMDSS newly installed stations. 2) PC/Net based O&M network is established linking 1st and 2nd stations with maintenance center in Jakarta for asset management of spare parts.	As planned
6. Reinforcement of Training Center	Establish at Jakarta station 1) Installation of radio and measurement equipment 2)Installation of GMDSS simulator 3) Installation of AIS simulator	As planned
7. Training of Operators and Technicians for relevant CRS	1) Training at Manufacturer in Japan: 30 participants for 1 month 2) Management training in Japan 3) Domestic training: 45 participants for 1.5 months 4) Training for the staff for the Comprehensive Maintenance Center: 5 participants for 3 weeks	1) As planned 2) As planned. Management training was conducted at Japan Coast Guard; 10 participants for 21 days 3), 4) Almost as planned ・In total of 60 GMDSS operators were trained in the following two trainings; i) 15 participants x 2 times = 30 participants for 15 days ii) 15 participants x 2 times = 30 participants for 8 days ・In total of 10 AIS operators were trained; 5 participants x 2 times = 10 participants for 8 days ・Trainings for technicians including staff for the Comprehensive Maintenance Center;

		10 participants x 4 times = 40 participants for 20 days
8. Consulting Services	Foreign: 132.5 M/M Indonesia: 136.5 M/M Total: 269 M/M	Foreign: 129 M/M Indonesia: 158 M/M Total: 287 M/M

*1 : Coastal Radio Stations are divided into four classes depending on administered sea areas, importance of ports and contents of services. 1st class stations meet all services required to coastal radio stations.
*2 : 13 stations where they were 4th class stations at the time of appraisal, upgraded to 3rd class stations at the time of ex-post evaluation.
*3 : 22 stations except Kuala Enok (Kuala Tungkal) and Manado where they were 4th class stations at the time of appraisal, upgraded to 3rd class stations.
*4 : Navigation Telex (NAVTEX) is an international automated medium frequency direct-printing service for the delivery of navigational and meteorological warnings and forecast as well as urgent marine safety information to ships. Coastal Radio Stations deliver the information six times a day (every four hours).

Source: Information from JICA at the time of appraisal, results from questionnaire survey of executing agency, and interview survey results from the field survey

Intended outputs were realized mostly as planned. The main reasons for addition and modification from the plan are as below. Those changes are deemed appropriate since all of them were intended to enhance effectiveness of CRS.

＜Main additional and modification items＞

- MF/DSC equipment for Sea Area A2 was additionally installed into three 1st class stations, namely, Ambon, Semarang and Jayapura. Ambon station was out of scope at the time of the appraisal since the assessment survey could not be conducted due to the security reasons. However, during the implementation period, the need to improvement of Ambon station was identified after surveying the situation. Regarding Semarang and Jayapura stations, at the time of the assessment the GMDSS, the equipment was functioning well; however, during the installment period, the equipment had some problems due to the aging. Since manufacturers no longer produced spare parts, the equipment needed to be replaced to the new ones. This additional work was utilizing foreign exchange gains from the strong yen and depreciation of Indonesia rupiah.
- The additional equipment which can select frequency automatically was procured for NAVTEX. At the time of the appraisal, the plan was to use same frequency as International NAVTEX (518 kHz). However, after 2 years of the appraisal, IMO requested member countries to use 490 kHz for National NAVTEX, therefore, installing automatic frequency changers were required to meet the IMO request.

In regard to the consulting services, intended scope of services was implemented as planned. The reason for the increase in the input of total services was due to the additional installation, change of sites and modification of design as stipulated in the Table 1. It was also found that actual man months (hereinafter referred to as “M/M”) of foreign consultants was

decreased and M/M of local consultants was increased. This was found that foreign consultants had difficulties to visit some project sites due to the security reasons at the time of detailed study[9]. Instead, local consultants alone implemented survey. Accordingly, the change of inputs of consulting services was deemed appropriate in light of the actual situation at the time of implementation.

GMDSS（VHS/DSC）Equipment (Kalianget CRS)

AIS Equipment (Cilacap CRS)

NAVTEX Transmitter (Jakarta CRS)

Moved Transmission Station of Surabaya

[9] In 2006 when the field survey was conducted, situation and condition of east Indonesia were not conducive for foreigners to travel due to the internal conflict. Japanese were restricted to travel these areas at that time.

Figure1: Project Locations (GMDSS newly installed 33 CRS)

3.2.2 Project inputs

3.2.2.1 Project Cost

Total project cost was initially planned to be 6,550 million yen (out of which 5,567 million yen was to be covered by Japanese ODA loan). In reality, the total project cost was 5,908 million yen (out of which 5,382 million yen was covered by Japanese ODA loan) which was lower than planned (90% of the planned amount).

The reason why the project cost was within the plan despite the additional outputs was mainly due to the exchange gains from the strong yen[10].

3.2.2.2 Project Period

The overall project period was planned as 67 months, from April 2004 (conclusion of Loan Agreement) to November 2009 (completion of consulting services). In reality, the overall project period was 96 months, from April 2004 (conclusion of Loan Agreement) to March 2012 (completion of consulting services), which was longer than planned (143%).

Table 2 shows the comparison of planned and actual project period.

[10] Exchange rate at the time of the appraisal was ¥1 = Rp. 71.4, while actual exchange rate during the implementation period was ¥1 = Rp. 110, which produced gains about 54% from the strong yen.

Table 2: Comparison of Planned and Actual Project Period

Item	Planned (At Project Appraisal)	Actual (At Ex-post Evaluation)
1. Selection of consultants	Apr. 2004 – Mar. 2005	Apr. 2004 – Apr. 2006
2. Consulting Services	Apr. 2005 – Nov. 2009	Aug. 2006 – Mar. 2012
3. Tender/Contract	Apr. 2005- Dec. 2006	Jan. 2007 – Feb. 2009
4. Installation/Training	Feb. 2007 – Nov. 2008	Feb. 2009 – Nov. 2011 (Jan. – Nov. 2011 for Additional installation)
5. Defect Liability	Dec. 2008 – Nov. 2009	Dec. 2011 – Nov. 2012
Total	Apr. 2004- Nov. 2009 (67 months)	Apr. 2004 – Mar. 2012 (96 months)

Source: Information from JICA at the time of appraisal, results from questionnaire survey of executing agency, and interview survey results from the field survey

The main reasons of delay are listed below;

- In selection of consultants, the number of bidders was lower than the procurement regulation of Indonesia (Presidential Decree 80 (Keppres 80)), which regulates minimum number of bidders. Based on the Keppres 80, prequalification (P/Q) process had to be carried out again from the beginning. In addition, according to the Keppres 80, the project with more than 100 billion rupiah (about 10 million US dollars) had to go through minister's authorization, which took some extra time.
- Additional works were emerged due to the additional outputs.
- Regarding relocation of Samarinda CRS, the site had to be changed since the roads to the planned location became impassable due to other development works during the implementation period. As a result, it took some time to select location of stations.
- Ende and Maumere CRS were supposed to be relocated to the new locations since they were thought to be situated on the land of port authorities. However, during the implementation period new regulation were issued and identified that those lands were belonging to the DGST. Therefore, there was no need to relocate the places; however, the design of system had to be modified to improve the communication system at the existing place.
- Due to the delay in revising Minister's decree in 2011, the approval to carry over the budget from 2010 to 2011 which was meant for construction of facilities took long period.

3.2.3 Results of Calculations of Internal Rates of Return (Reference Only): Economic Internal Rates of Return (EIRR)

The assessment of monetary value of human life is difficult. Therefore, EIRR was not calculated in this project.

Although the project cost was within the plan, the project period exceeded the plan.

Therefore, efficiency of the project is fair.

3.3 Effectiveness[11] (Rating: ②)

3.3.1 Quantitative Effects (Operation and Effect indicators)

（1） Operation Hours of GMDSS Coastal Radio Stations

Below table shows the baseline and target which were set at the appraisal and actual figure of operation hours of GMDSS newly installed stations by the project. Stations which are equipped with GMDSS are mandated to operate 24 hours by the regulation of DGST.

The target stations have been improved with necessary system to operate 24 hours such as ensuring power supply by the project. In fact, according to the results from interview with the executing agency and questionnaire to the target stations, it was confirmed that most of the target stations have been operating 24 hours a day, thus, it can be regarded that the original goal has been achieved. However, at the time of the ex-post evaluation, GMDSS equipment of 4 out of 33 target stations was damaged and not functioning well. Some have struck by the lightning and some GMDSS connected computers have been infected by virus[12].

Table 3: Operation Indicator

Indicator	Baseline*1 (2004)	Target*1 After 2 years of completion (2011)	Actual (2012) Completion Year	Actual (2013) After 1 year of completion	Actual*2 (2014)
Operation Hours of GMDSS (at 33 stations which GMDSS were newly installed by the project) (hours/day)	N/A	24 hours/day	24 hours/day	Almost 24 hours/day	Almost 24 hours/day

Source: *1: information from JICA at the time of appraisal *2: DGST and questionnaire/telephone interview results

（2） Compliance with the SOLAS Convention

DGST has been improved CRS by equipping GMDSS through assistance from the previous JICA's projects "Maritime Telecommunication System Development" (Phase I - III) as well as the projects from its own finance; however, the requirement of SOLAS Convention has not been fully met. Indonesian government had submitted a plan to equip GMDSS with 84 stations in accordance with the agreement with IMO at the time of appraisal. With this project which equipped GMDSS for 33 stations, in total 70 coastal radio stations have become

[11] Sub-rating for Effectiveness is to be put with consideration of Impact.
[12] In Kalianget CRS which was observed during the field visit, a computer connected to the GMDSS system had infected by virus in 2012. The equipment was sent for repair through the district office once but the virus could not be cleared completely. As a result, the computer connected to the GMDSS system has been left un-functioned until the time of the ex-post evaluation.

GMDSS stations. Accordingly, it could be said that the project contributed to the expansion of GMDSS coverage of Indonesian territorial sea and the Indonesia's obligation to meet the SOLAS Convention. According to the executing agency, after the agreement with IMO, Indonesia has established new ports around her coasts. Due to the establishment of new ports, it is required to equip additional GMDSS at other 19 stations at the time of the ex-post evaluation. DGST has a plan to improve these stations by 2016 with the national budget.

（3） Effectiveness of a Training Center

The training center was strengthened aiming to build capacity for the GMDSS/AIS operators and technicians for maintenance by introducing GMDSS and AIS simulators and others. The trainings for operators and technicians were conducted during the project period as shown in Table 1.

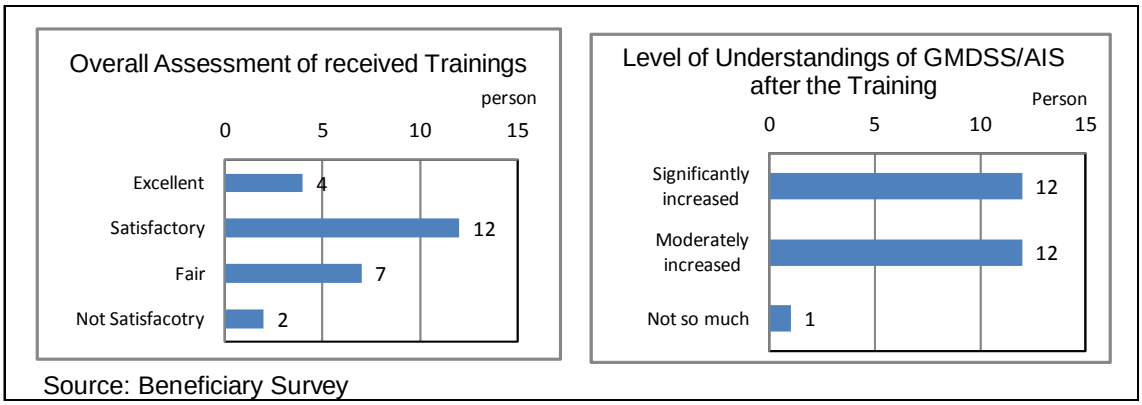


Figure 2: Assessment of Trainings Conducted during the Project Period (25 respondents)

The questionnaire for the ex-trainees[13] revealed that the level of satisfaction on the trainings was high as seeing from the results that 23 out of 25 ex-trainees (92%) responded positive to the trainings as shown in Figure 2. Many answered that they "understood how to use GMDSS and AIS equipment by the training" and "understood what should be done when the equipment was in need of repair or changing spare parts" as the reasons for satisfaction. For the question asking whether they have increased knowledge of GMDSS and AIS, almost all answered "Increased" to some degree. In addition, 20 out of 25 ex-trainees answered that the trainings using simulators were effective. Accordingly, the effectiveness of the training carried out during the project can be confirmed. The trainings were conducted at the training center which was enforced with the simulators provided by the project. It was also identified that the training became very effective for GMDSS/AIS operation and maintenance since they

[13] Questionnaires were distributed to 110 ex-trainees. However, only 25 ex-trainees answered the questionnaires. Out of 25 ex-trainees, 7 were technicians, 8 for operators, and 10 for management staff such as Chief CRS and DGST staff.

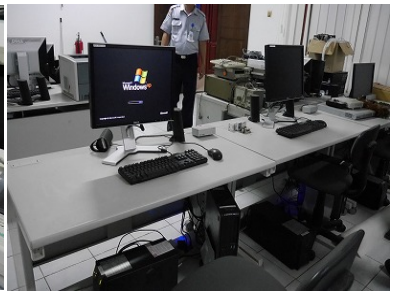
were practical and meeting the needs of trainees. Interviews with the executing agency and officials at the visited coastal radio stations confirmed that there was no particular problem in operation of the equipment which was provided by the project because of the trainings conducted during the project period. Furthermore, it was noted that the knowledge and skills on operation were shared by the ex-trainees to their colleagues at their stations after the training.

However, the training center has not been utilized after the completion of the project according to the interviews to the executing agency and Jakarta stations where the training center located. Last training course was carried out in 2011. As stated above, the effectiveness produced by the training center was high during the project period; however, at the time of the ex-post evaluation, effectiveness of the training center including equipment which was provided by the project has not been demonstrated. (The reason is covered in the "3.5.1 Institutional Aspects of Operation and Maintenance".)

（4） Effectiveness of a Comprehensive Maintenance Center

The comprehensive maintenance center was meant to be established to be a core maintenance center which served to all CRS by receiving repair request and providing technical advice. In addition, it was also meant to become a practical and efficient maintenance system such as through the web-based stock management of spare parts linking with 1st and 2nd class stations. As stated in "3.2.1 Project Output" above, the maintenance center was established at the Jakarta station and installed necessary equipment for maintenance such as GMDSS spare parts and radio measurement. Furthermore, a web-based network was set up between 1st/2nd stations with the maintenance center in Jakarta. However, according to the interviews to the executing agency, Jakarta station and examination of Surabaya station (1st station) where web-based network was established, it was found out that the expected roles have been played neither during the project period nor at the time of the ex-post evaluation. Accordingly, the effect as a maintenance center has not been demonstrated. (The reason is covered in the "3.5.1 Institutional Aspects of Operation and Maintenance".)

Training Center
(GMDSS Simulator)



Training Center
(AIS Simulator)

Measurement Equipment
provided for
Maintenance Center

3.3.2 Qualitative Effects

A beneficiary survey was conducted to assess effectiveness and impact by the project. The survey targeted captains, radio operators, navigation officers of ships which equipped with GMDSS, AIS or NAVTEX and who were using the services of CRS. The total of 87 samples was collected[14].

（1） Satisfaction level of beneficiaries

According to the results of the satisfaction survey on the improvement of CRS by the project targeting the maritime service providers who were utilizing GMDSS, AIS and NAVTEX, as shown in the Figure 3 below, 28% of respondents (24 respondents) rated “Very much satisfied”, followed by “Satisfied” for 70% (61 respondents) and “To some extent” for 2 respondents. There was not any respondent who answered “Not so much” or “Not at all”. Therefore, it can be said that all of the respondents satisfied to some degree with the improvement of services provided by CRS. It can be assumed that the project has met the needs of the beneficiaries.

（2） Ensuring the security of life and property of ships navigating in Indonesian waters

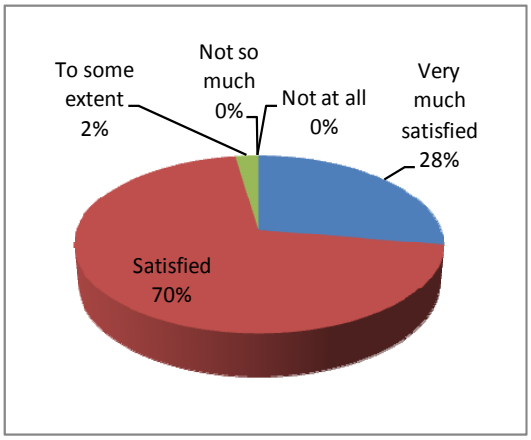
According to the beneficiary survey, as shown in the Figure 4 below, most of the respondents, 75 out of 87 respondents (86.2%) answered “Increase in safety for navigation” for the changes after the introduction of GMDSS/NAVTEX. In fact, judging from the replies of radio operators at the interviews, it was found that the installation of GMDSS/NAVTEX at CRS brought a sense of safety. Radio operators replied to the interviews that they felt “much safer knowing that the GMDSS has been installed at CRS”. Others answered that “although they communicate with the company to which they belong at the regular situation, they felt safer knowing that CRS could respond to the emergency situation”.

In the case of emergency, GMDSS alert is transmitted by terrestrial communication to CRS. Those CRS which received GMDSS alert communicate the National Safety and Rescue Agency (BASARNAS) and port authorities for rescue activities. The ship can also communicate directly with BASARNAS by satellite communication. In the actual situation where the ships send emergency signal, maritime safety and rescue activities can be ensured using either terrestrial or satellite communications complementarily. In this way, the coverage

[14] A beneficiary survey for GMDSS users were conducted at Surabaya, Kalianget and Palembang ports. The sample was collected from 49 shipmen. For NAVTEX users, the survey was conducted at Jakarta Port (Tanjung Priok) with sample of 38 shipmen. Therefore, a total of 87 samples was collected at random with face to face interview. The occupation groups of the sample were; Ship captains (13, 14.9%), Radio operators (44, 50.6%), Chief officers (5, 5.8%), Second officers (22, 25.3%), and Others (3, 3.4%). The shipping categories were; Cargo (81, 93.1%), and Passenger ships (6, 6.9%). The shipping operation were; International (30, 34.5%) and Domestic (57, 65.5%).

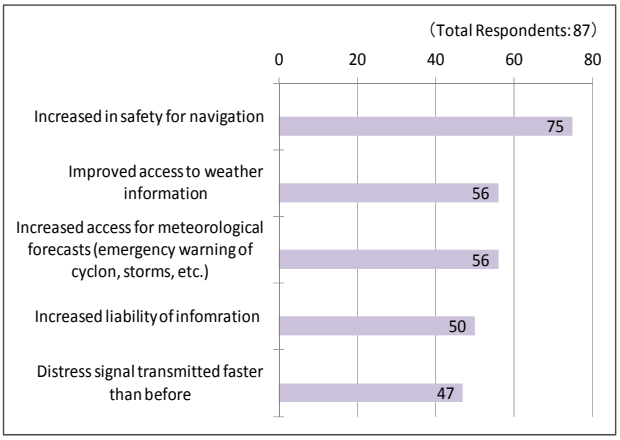
of GMDSS terrestrial transmitted areas were increased, thus, the project contributed to enhancing the total safety for the ships.

From the above, it can be said that the project has contributed to ensuring the security of life and property of ships navigating in the Indonesian waters.



Source: Results from the beneficiary survey

Figure 3: Satisfaction level of Beneficiaries to the project



Source: Results from the beneficiary survey

Figure 4: Changes after the introduction of GMDSS/NAVTEX (Multiple Answers)

<Actual Examples that had an Effect by GMDSS >

- When the ferry (Ro-Ro ship) was on fire off the coast of Jakarta in 2012, Jakarta CRS promptly communicated with BSARNAS and the port authority after receiving GMDSS alert, which led to the rapid rescue activities.
- According to the captain of Ro-Ro ship anchoring at the Kalianget port, he could manage to travel avoiding the damaged ship by receiving those information from the Kalianget CRS. Kalianget CRS received GMDSS alert from the damaged ship and the navigation information on this was delivered to the nearby ships. It is one of the effects of GMDSS.
- When the cargo travelling between Surabaya, Sampit and Batulicin was hijacked, by sending emergency signal by GMDSS to the CRS and nearby ships, the cargo was rescued immediately.
- When the GMDSS equipped ship happened to find a small boat towing the damaged ship, the GMDSS equipped ship sent an alert to the CRS by GMDSS. The CRS which has received the signal requested the rescue to the relevant organizations such as port authority and BASARNAS, and assured the security by sending the risk information to the ships travelling near those ships.

(From the interview results at the beneficiary survey)

Kalianget CRS

Cargo which equipped GMDSS
(Surabaya Port)

3.4 Impacts

3.4.1 Intended Impacts

3.4.1.1 Promotion of Maritime Industry

Table 4 shows the number of passengers, volume of cargo and ships entering into Indonesian ports. The number of passengers was maintained around 16 million people between 2009 and 2013. On the other hand, both volume of cargo and entry number of ship have an increasing tendency. This is indicating that maritime business in Indonesia is by and large expanding.

Table 4: Volume of Passenger, Cargo and Number of Ships entry into Indonesia

Item	Unit	2009	2010	2011	2012	2013
Number of Passenger	（1,000 persons）	15,620	15,548	17,441	17,620	16,127
Volume of Cargo	（1,000 TEU*）	9,260	10,530	11,693	13,295	13,527
Ships entry	（Number）	250,244	259,197	280,408	268,686	272,780

Note：TEUS：Twenty-foot Equivalent Unit
Source: DGST

The result of beneficiary survey on the promotion of the maritime business is shown in the Table 5.

Table 5: Impact on the Promotion of Maritime Business

Questions	**Responses (n=87 respondents)**
(a) After the project, has your business improved by the services provided by CRS?	1. Very much improved 13 (14.9%) 2. Improved 58 (66.8%) 3. No relation 7 (8.0%) 4. I don't know 9 (10.3%)
(b) What services of CRS do you think most relevant to the improvement of your business? (free opinion)	・Updated weather information and navigation information are very useful for the business since the timing of departure and arrival could be planned accurately. (28, 32.2%) ・The business chances have been increased with safer navigation by getting reliable information from CRS (passengers feel safer) (13, 14.9%) ・Increased safety by accurate information (11, 12.6%) ・The communication with CRS became increased (4, 4.6%) ・The communication with other ships increased and shared information (3, 3.4%)

Source: Results from the beneficiary survey

81.7 % (71 respondents), of shipping operators answered that after the project their business has been increased either "very much" or "much" by the improvement of services provided by CRS. 32.2 % (28 respondents) of shipping operators raised that the business became efficient by making an accurate plan of departure and unloading through obtaining updated weather information and navigation information. 14.9% (13 respondents) answered that they could appeal customers for safe navigation with obtaining accurate information. 12.6% (11 respondents) raised the increase in the navigation safety with reliable information. The increase in communication with CRS and other ships were also pointed out by some respondents.

Although the promotion of maritime business has been not only led by services of CRS but

also by other factors, in light of the above, it is considered that the improvement of facility at CRS by the project brought the enhancement of the level of services and contributed to a certain extent to the promotion of maritime business.

3.4.2 Other Impacts

3.4.2.1 Impacts on the Natural Environment

Environmental Impact Assessment has not been required for the project based on the law and regulations in Indonesia. It was confirmed by the executing agency that there has not been any impact on the natural environment at the time of ex-post evaluation even during the construction period.

3.4.2.2 Land Acquisition and Resettlement

The project required land acquisition for relocation of Surabaya, Makassar, Benoa, Manado, Kupang, Kuala Enok (Kuala Tungkal) and Samarinda CRS. However, there was no resettlement issue. The land acquisition for the project was implemented in accordance with the procedures of "Land Acquisition Law" in Indonesia. Some delays occurred in some of the sites, but there were no particular problems.

Although it was noted that the training center and the comprehensive maintenance center have not been utilized after the project, this project has to some extent achieved its objectives. Therefore, effectiveness and impact of the project are fair.

3.5 Sustainability (Rating: ②)

3.5.1 Institutional Aspects of Operation and Maintenance

The coastal radio stations which are managed by DGST have 154 stations. Each CRS is operated and maintained under district navigation offices which they have 25 offices across the country under the Directorate of Navigation (DON), DGST. Table 6 shows the number of staff who are related to CRS. In total, about 1,300 staff are allocated in the country.

Table 6: Number of Staff related to CRS

Type of Employment	Staff Number
Directorate of Navigation	23
Chief CRS	154
Operator	966
Maintenance technician	151
Total	1294

Source: DON, DGST

In 2005, DON established a standard number of staff according to the class of CRS and specific qualification based on the job category. However, in reality, “an ideal number of staff” is separately established taking into account the situation of each CRS. If compared the ideal number and actual number of staff, upper class CRS such as 1st class are fulfilled their requirement. However, most of lower class CRS do not reach the ideal number of staff. In particular, the 4th class CRS has such tendency and in many cases there are only operators allocated, but no technicians. As examples, standard number, the ideal number and actual number of staff of Kalianget (3rd class) and Sabang (2nd class) CRS are exhibited in Table 7 and Table 8 respectively.

Table 7: Number of Staff in Kalianget CRS

Category*	Standard	Ideal	Actual
SRE I	1	0	0
SRE II	6	2(Admin)	1
ORU	22	12	2
TTP I	0	5	0
TTP II	1		0
TTP III	2		0
Montir	3		1
合計	35	19	4

Table 8: Number of Staff in Sabang CRS

Category *	Standard	Ideal	Actual
SRE I	7	4 (Admin)	2 (Admin)
SRE II	10		
ORU	17	25	19
TTP I	1	17	4
TTP II	2		
TTP III	7		
Montir	8		
合計	52	46	25

*Note: SRE: Electronic Radio Certificate (I: Diploma on Electronic engineer (more than 3 years), II: Diploma on Electronic engineer (2 years), ORU: General Operator Certificate (1 year diploma)), TTP: Marine Telecommunication Technician (I: Diploma on Engineering (more than 3 years), II: Diploma on Engineering (2 years), III: Diploma on Engineering (1 year)), Montir: Assistant Technician (Graduates from Vocational school/High school)
Source: “Manual for Marine Telecommunication”, January, 2005, DGST

CRS which equipped with GMDSS is obliged to operate 24 hours. It is assumed that operators work in three shift forming in four groups (one group for stand-by). However, there are stations that have only four operators like Kalianget CRS. It was noted that even those stations with limited number of staff could manage to operate 24 hours establishing an emergency response system, such as having staff quarters next to the CRS.

One of the reasons for the shortage of staff was pointed out that the Indonesian government, in principle, has frozen the new recruitment during the period of moratorium on staff recruitment for budget squeeze since 2009. Some vacancies due to separation or retirement will be filled but not all of them. It was noted that there was a problem of understaffing although it did not affect seriously for the standard operation of CRS.

As stated above, the reasons why the training center and the comprehensive maintenance center have not been utilized are largely due to the organizational issues such as operational

procedure and budget allocation system of the Ministry of Transport. After the completion of the project, both centers were registered as "assets" of Tanjung Priok district office which administers Jakarta station. As discussed later in the "Financial Aspects of Operation and Maintenance", the budget for CRS is allocated to 25 district offices. Tanjung Priok district office has neither budget nor responsibility for trainings and repairs for stations that are not under its jurisdiction. Therefore, it was not able for Tanjung Priok district office to meet the intended works that the project had expected[15].

Besides, regarding the trainings for CRS staff at the training center, DON and district offices do not have mandate to carry out trainings from their own, and they do not have qualified staff who can conduct trainings. The budget for Tanjung Priok district office where the training center is belonging covers only the CRS which are under its jurisdiction. Therefore, the staff are belonging to the CRS which have been equipped with GMDSS/AIS by the project but are not under Tanjung Priok district office would be excluded. Therefore, the training center has not been utilized.

While, there is Human Resources Development of Sea Transportation Center (HRDSTC) under the Ministry of Transport which has a mandate to conduct trainings and education. HRDSTC conducts a part of trainings for CRS staff as well[16]. Simulators for GMDSS and AIS are found to be effective tools for trainings. If the project had discussed about inviting trainers from HRDSTC and budget issues, the training center could have been utilized effectively even after the project.

The comprehensive maintenance center was designed to have a central maintenance function at Jakarta in mind. However, technicians and budget for this purpose were not allocated to the Tanjung Priok district office. Besides, Tanjung Priok district office does not have mandate to make repairs for the equipment of CRS other than its jurisdiction. Therefore, the maintenance center has not been utilized.

Although some problems were found in operation procedures in each of the training center and the comprehensive maintenance center, at the time of the ex-post evaluation, the discussion on the future modality and effective use of both centers has been started among stakeholders and the improving trend was observed in the situation.

In light of the above, regarding the personnel issues, the shortage of staff, especially in the 3rd and 4th class CRS, remains the challenge as having been pointed out in the previous phase I to phase III projects. However, it was confirmed that a minimum number of personnel had

[15] When the training was conducted during the project period, the training center had not been registered as asset of Tanjung Priok district office. The trainings were arranged by the project with project finance and trainers from contractors.

[16] HRDSTC has the role as the technical monitoring and authority for all maritime education, academies and training schools in Indonesia. There are 10 institutions for maritime education and training under HRDSTC. Among them, BPPTL is for civil servants and the staff of coastal radio stations can receive the trainings.

been secured to operate CRS for 24 hours. The training center and the comprehensive maintenance center were identified as idle due to the organizational issues. However, considering that basic technical skills to operate GMDSS and AIS have been established in CRS and that some degree of system for maintenance exists, it was confirmed that those issues did not hamper greatly for operation and maintenance of the project outputs.

3.5.2 Technical Aspects of Operation and Maintenance

The staff fulfills technical level which requires for his job category. Regarding GMDSS and AIS equipment which the project provided, the trainings were conducted during the project period to the target CRS staff; therefore, no major problem in the operation of those equipment can be seen. As stated in the “effectiveness”, the trainings utilizing simulators were very effective. The manuals for the equipment were kept in the target CRS and they were referred when necessary.

However, the trainings were conducted for 2-3 staff from each target CRS and technical transfer to other staff was done by only OJT through those trained staff. DGST has been arranging the short-term training courses for operators and technicians of CRS as their human recourses development. Those trainings are done at the educational institute under the Ministry of Transport, or at outsourced organizations such as universities and private institutes, but the number of trainees is limited due to the availability of budget of DON. In 2013, DON, DGST organized short courses for about 30 staff each from operators and technicians respectively[17]. Considering the fact that there are 966 operators alone in the country, the opportunity to receive the training seems very limited. Besides, according to the interviews to the CRS staff at the field visits, they pointed out the strong needs for practical training since most of trainings organized by DGST were theoretical. It was also found that opportunities for training for technicians to update repair skills and new technology were very limited and the technicians usually implement simple routine maintenance.

The equipment of the training center and the comprehensive maintenance center were maintained periodically by the technicians of Jakarta CRS and it was confirmed that most of them were kept in good condition.

In light of the above, it can be said that the technical level of CRS staff at the time of the ex-post evaluation has sufficient for actual operation and maintenance. However, it was identified that there were rooms for improvement for future technical transfer. Utilization of the training center could be effective since the training opportunities are limited.

[17] According to the executing agency, in 2013, 30 operators (commissioned to the private institute), 25 technicians (commissioned to Indonesia State University) were trained, and the trainings for Vessel Traffic Services (VTS) center (a part of AIS training was included) were conducted with assistance of Australian government.

3.5.3 Financial Aspects of Operation and Maintenance

DON, DGST allocates budget for operation and maintenance of CRS to 25 district offices. District offices are administered operation and maintenance cost for CRS which are under their jurisdiction. In the case that the CRS has a maintenance problem, CRS request the budget for repair to the district office. Figure 5 shows budgetary status for operation and maintenance of CRS which are allocated to the 25 district offices[18]. "Routine expenditure" is the cost for the small scale repair and purchase of spare parts. "Capital expenditure" is the cost for purchase of goods and equipment and improvement of facilities. It is allocated only for those which will be necessary to invest for that year.

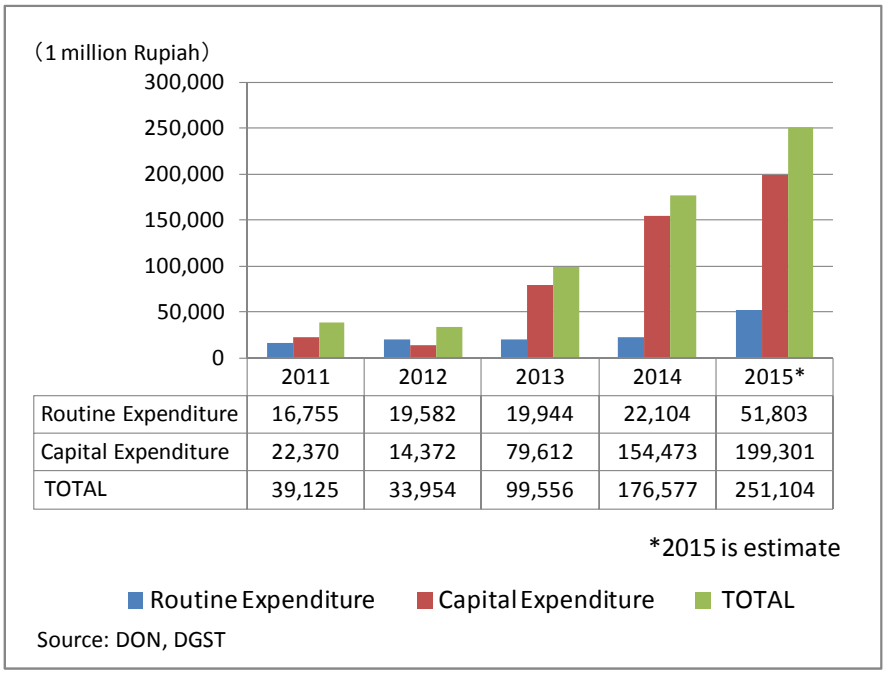


Figure 5: Budgetary Status for Operation and Maintenance of CRS (2011-2015)

Note: 1,000 Rupiah = about 10 yen (Rate: December 2014)

The actual expenditure has been increasing year by year between 2011 and 2014. The reason for increase is largely on the increase in "Capital expenditure". The routine expenditure has been also increasing year by year; however, only 10% increase can be achieved from 2013 to 2014.

It was confirmed from the interviews to the executing agency and the CRS at the field visits there was no major obstacle to operate CRS with the current routine maintenance

[18] At the time of appraisal, it was expected that lighthouse tax which had been collected since 2000 would become a part of maintenance budget for CRS. However, related taxes and fees such as lighthouse tax and public telecommunication fee flows into the national account and allocated to the Ministry of Transport as general budget since 2010. Therefore, the light house tax which was thought to be a financial source for maintenance was not exactly secured.

budget. However, the current routine maintenance budget only covers the minor repair, therefore, the funds sometimes had to be diverted from the capital budget when it was necessary. Usually, the budget is allocated from DON to the district offices without delay, however, when the necessity to make repair which exceeds the usual budget arises, the excess budget cannot be disbursed timely. So the request has to make the following financial year for that repair. The interview to the CRS also revealed that ensuring necessary budget timely for repair and spare parts was difficult.

In light of the above, there are some concerns in financial aspects of operation and maintenance of the project.

3.5.4 Current Status of Operation and Maintenance

Although the questionnaires on the status of installed equipment were not able to be collected from all targeted CRS, through the telephone interviews to the CRS to the extent possible, it was confirmed that the GMDSS system was operating without much problems except four stations. Regarding AIS and NAVTEX equipment installed at the four stations respectively were operating without any problem.

Three out of the four stations whose GMDSS system had problems at the time of the ex-post evaluation, were damaged by the lightning and operated only 12 hours a day. GMDSS at Ende station was hit by the lighting recently in December 2014; however, in the other two stations, namely Pare-Pare and Tegal stations GMDSS equipment were damaged in January 2014 and November 2011 respectively. Since then, those damaged equipment have been left unrepaired. The other damaged GMDSS system was at Kalianget station. The computer which was connected to the GMDSS system was infected by virus since 2012 and the GMDSS system could not be utilized fully. Since GMDSS system contributes to the safety of navigation, it is expected for the executing agency that monitoring of the operation and maintenance status of CRS through district offices should be strengthened. In addition, immediate response should be considered with providing appropriate budget according to importance and urgency.

Some minor problems have been observed in terms of institutional, technical and financial aspects. Therefore, sustainability of the project effect is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The project aimed to fulfill the requirement of 1974 SOLAS Convention, to secure the safety of maritime navigation, and to respond promptly to maritime accidents by facilitating GMDSS and AIS at 33 and 4 coastal radio stations respectively in Indonesia. The project is

well consistent with the development policy and development needs of Indonesia, as well as with the Japan's ODA policy; thus, the relevance of the project is high. The operation/effect indicator that targeting 24 hours of operation hours of GMDSS at newly installed stations by the project has been achieved at almost all target CRS. Moreover, the project expanded the coverage areas of maritime communication of GMDSS and contributed to the Indonesia's obligation to fulfill the requirement of SOLAS Convention. A beneficiary survey confirmed that the benefits of the project (improvement of navigation safety, increase of access to weather and navigation information, and acceleration of emergency distress response) were recognized by the GMDSS users. Furthermore, the project contributed to the service of CRS as well as the promotion of maritime business. However, the training center and the comprehensive maintenance center were not utilized after the completion of the project and the effectiveness produced by these two centers were limited; thus, the project's effectiveness and impact are fair. The project efficiency is fair because the project period exceeded the plan although the project cost was within the plan. In regard to operation and maintenance, no major problems have been observed. However, there is room for improvement on the operation of the two centers mentioned above, as well as institutional and technical aspects; thus, sustainability of the project is fair.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

・ Expand the practical training opportunities utilizing the training center

The simulators for GMDSS and AIS which were installed by the project were found to be very effective for the training since they could conduct practical trainings which have high demands. Although at the time of the ex-post evaluation, discussion has been initiated regarding the future operation of the equipment between the executing agency and HRDSTC, it is expected that the effective utilization of the equipment by the project should be considered in early manner. It should be noted that detailed operational methodology including which budget should be used, contents, and certificates for the trainings should be discussed and agreed among stakeholders.

・ Effective utilization of equipment which were provided to the comprehensive maintenance center

Since it cannot be expected that the assumed role of the comprehensive maintenance center is realized due to staff and technical issues, there is need to develop a strategy for effective use of the equipment and spare parts which were provided by the project. Continuing discussion between Tanjung Priok district office where the center belongs to and the relevant officers such as DON, it is expected that measures should be considered to benefit the target

CRS by the project. In fact, there are CRS whose GMDSS equipment is damaged such as by the lightning. Operational procedures and budgetary provision which could be preferentially granted to such CRS should be considered.

- Immediate implementation of necessary repair for damaged GMDSS and strengthening of monitoring

At the time of the ex-post evaluation, GMDSS equipment of four stations was found to be damaged. Some were recently damaged but others have been left unrepaired more than two years. In view of the importance of GMDSS, monitoring of the equipment of CRS should be further strengthened through district offices and repair of damaged GMDSS system is expected to be made promptly.

4.2.2 Recommendation to JICA

None.

4.3 Lessons Learned

- Clarification of regulations, budget and mandate for provided equipment to be utilized practically after the project

In the Ministry of Transport in Indonesia, the directorates and departments are organizationally independent each other. Provided equipment is registered as asset of recipient directorates or district offices separately. Therefore, institutionally it is difficult to transfer the asset from one directorate to another or to manage it commonly. Since the training equipment was installed in the office which did not have mandate, personnel, nor budget to conduct trainings, the equipment was not utilized after the project completion. In the same manner, maintenance equipment was registered at one district office, therefore, the delivery of spare parts to other offices could not be allowed. Therefore, when the project includes equipment provision, the scope and approach of the project should be decided and agreed only after thorough examination and discussions with relevant organizations ensuring whether the equipment is surely utilized under the current arrangement in terms of operational regulations, mandate and budget.

END

Comparison of the Original and Actual Scope of the Project

Items	Original	Actual
1. Project Outputs	1) Installation of GMDSS 1. MF/DSC for Sea Area A2 19 stations 2. VHF/DSC for Sea Area A1 33 stations 2) Improvement of CRS for enabling to cover GMDSS 1. separation of transmitting and receiving stations(Teluk Bayur and Benoa) 2. Improvement of environment for Surabaya and Makassar stations 3. Improvement of VHF coverage areas for Dumai and Samarinda stations 4. Replacement of aged engine-generators at 1st and 2nd class stations (total of 14 stations) 5. Replacement of aged antennas at 1st and 2nd stations (total of 12 stations) 6. Additional works 3) Commencement of National NAVTEX (4 stations: Jakarta, Makassar, Ambon and Jayapura) 4) Installation of AIS (4 stations: Belawan, Dumai, Sabang, Jakarta) 5) Establishment of a Comprehensive Maintenance Center 6) Reinforcement of a Training Center 7) Training of Operators and Technicians for relevant CRS 8) Consultancy Services a) Detailed design b) Contract Assistance Services c) Factory Inspection Services d) Installation Supervision Services e) Maintenance Advisory and Final Acceptance Services f) Technical Transfer and Training	1) Installation of GMDSS 1. MF/DSC for Sea Area A2 22 stations 2. VHF/DSC for Sea Area A1 As planned 2) Improvement of CRS for enabling to cover GMDSS 1. As planned. 2. As planned. 3. As planned. (For Samarinda, location was changed) 4. In addition to the original plan, aged engine-generators of 3rd and 4th stations were replaced. (total of 41 stations) 5. As planned 6. Tower for Dumai station was strengthened. Modified the tower design and location of tower for Ende and Maumere stations. Additionally purchased Antenna for NAVTEX for Jakarta station. 3) As planned. 4) 2 stations were changed (Lhokseumawe, Cilacap, Dumai, Sabang) 5) As planned. 6) As planned. 7) As planned. 8) Consultancy Services Necessary tasks have been implemented as planned.
2. Project Period	April, 2004 – November, 2009 (67 months)	April, 2004 – March, 2012 (96 months)

3. Project Cost Amount paid in Foreign currency	4,342 million yen	5,371 million yen
Amount paid in Local currency	2,208 million yen (157,714 million rupiah)	532 million yen (59,072 million rupiah)
Total	6,550 million yen	5,908 million yen
Japanese ODA loan portion	5,568 million yen	5,382 million yen
Exchange rate	1 rupiah ＝0.014 yen (As of October, 2003)	1rupia＝0.009 yen