

Republic of Indonesia

Ex-Post Evaluation of Japanese ODA Loan

“Maritime Education and Training Improvement Project”

External Evaluator: Keishi Miyazaki, OPMAC Corporation

## **0. Summary**

The objective of this project was to improve the capacity of Indonesian seafarers to meet the requirements of STCW95<sup>1</sup> in their qualifications by the construction and installation of necessary facilities and equipment for training and education based on STCW95, together with capacity development of trainers in six government Maritime Education and Training Institutions (METIs). This project has been highly relevant to Indonesia’s development plan and development needs, as well as to Japan’s ODA policy. Therefore its relevance is high. Both the number of fulltime students on STCW95 compliant training to obtain certificates of competency and the number of graduates who passed the STCW95 compliant national examination fully achieved their respective targets. It was confirmed that the project contributed to improvements in the educational levels of the six METIs to some extent through the realization of the provision of seafarers’ education and training in compliance with STCW95. However, the annual operation hours of major simulators of the project have not yet met the target as the operation of some simulators has been suspended due to breakdown and malfunction. Each school has made efforts to fulfill the required hours for practical training based on the annual training curriculum by utilizing a combination of the project equipment and similar types of other equipment introduced with the assistance of other donors. It was confirmed that the project had positive impacts to some extent on securing employment opportunities for Indonesian seafarers, improving the safety of marine transport, and promoting opportunities for foreign currency earning. Therefore, the effectiveness and impact of the project are fair. Although the project cost was within the plan, the project period exceeded the plan. Therefore, the efficiency of the project is fair. Problems were observed in the current status of operation and maintenance of a part of the project equipment, and there have been constraints in the budget for operation, maintenance and management because of the delay in ownership transfer of the project equipment from the executing agency to the six target METIs. Therefore the sustainability of the project effects is fair.

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

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<sup>1</sup> Regarding STCW95, please see “1.2 Project Outline”.

## 1. Project Description



Project Locations



The Ship Maneuvering Simulator introduced by the Project (PIP Makassar)

### 1.1 Background

In Indonesia, the world's largest archipelagic nation, marine transport including domestic and foreign shipping is a major industry. In 1995, Indonesia was the second largest country after the Philippines in this respect having more than 80 thousand qualified seafarers, which counted 7% of the total of seafarers in the world.

The education of Indonesian seafarers<sup>2</sup> has been provided in compliance with the International Convention on Standards of Training Certification and Watchkeeping for Seafarers (STCW) established in 1978. The STCW Convention was revised in 1995 (STCW95) and became effective in 1997, then it was scheduled to be fully implemented in February 2002 after a five-years transition period. As a result of the enforcement of STCW95, seafarers who had obtained their certificates in the countries judged as non-compliant with STCW95 in the training of seafarers and the examination of certificates were obliged to lose their seafarers certificates after February 2002.

In order to maintain the effectiveness of Indonesian seafarers certificates, Indonesia had been working towards the improvement of seafarers education and the establishment of a seafarers certificate system in compliance with STCW95 through the development of a related legal framework and the establishment of manuals meeting the requirement of STCW in related organizations. However, the improvement of training in the Maritime Education and Training Institutions (METIs), including improvements in training equipment, did not progress. Therefore, the improvement of training equipment, curricula, and the capacity deployment of instructors in METIs was an urgent issue.

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<sup>2</sup> Seafarers are classified into two groups: Officer and Rating. Officers are referred to as "Marine Officers (Nautical, Technical)" and ratings are referred to as "Ratings (Nautical, Technical)". Maritime Officers have certificates ranging from First Grade (DOC/EOC-I) to Fifth (DOC/EOC-V).

## 1.2 Project Outline

The objective of the project is to train Indonesian seafarers to meet the requirements of STCW95 (Remarks 1) by the construction and installation of necessary facilities and equipment for training and education based on STCW95 and the capacity development of trainers in the six government Maritime Education and Training Institutions (METIs) (Remarks 2), thereby securing employment opportunities for seafarers and promoting opportunities for foreign currency earning.

(Remarks 1) The STCW (Standards of Training and Certification of Watchkeeping for Seafarer) is an international convention adopted in 1978 by the International Maritime Organization (IMO). The STCW defines the requirements for the minimum skills and capacity of seafarers to prevent accidents at sea, as well as the international standards regarding supervision and monitoring for seafarers' education agencies and the issuance of seafarers' certificates in the signatory countries (STCW came into effect in 1984). The STCW Convention has been amended several times, but a comprehensive reexamination was carried out in amendments of 1995 (STCW95) including a revision of requirements for seafarers' training and qualification (STCW95 came into effect in 1997). Since then, STCW has been amended continuously<sup>3</sup>, and the latest version at the time of ex-post evaluation was STCW2010 which had been amended in 2010. As of end of July 2013, there are total 157 signatory countries of the STCW Convention, including Indonesia.

(Remarks 2) The six METIs are (i) Merchant Marine College (BP3IP), (ii) Maritime Higher Education and Training Institute Jakarta (STIP Jakarta), (iii) Merchant Marine Polytechnics Semarang (PIP Semarang), (iv) Merchant Marine Polytechnics Makassar (PIP Makassar), (v) Merchant Marine Polytechnics Surabaya (PIP Surabaya) (PIP Surabaya was upgraded from Merchant Marine School in 2013), (vi) Merchant Marine School, Barombong (BP2IP Barombong).

Loan Approved Amount/ Disbursed Amount	7,669 million yen / 5,705 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	March 2001 / December 2001
Terms and Conditions	Interest Rate: 0.75% Repayment Period: 40 years (Grace period: 10 year) Condition of Procurement: Bilateral tied
Borrower / Executing Agency	The Republic of Indonesia / Transportation Human Resources Development Agencies (THRDA), Ministry of Transportation (MOT)

<sup>3</sup> There were minor modifications after the establishment of STCW95 in amendments in 1997, 1998, 2003, 2004, 2005 and 2006.

Final Disbursement Date	June 2011
Related Projects	<p><u>ODA Loan</u></p> <ul style="list-style-type: none"> <li>• Equipment Supply For Maritime Sector Training Program (1985)</li> <li>• Rating Schools Establishment Project (1995)</li> </ul> <p><u>Grant Aid</u></p> <ul style="list-style-type: none"> <li>• Project for Improvement of the Ujung Pandang Rating School (1986)</li> <li>• Project for Improvement of the Barombong Rating School (1994)</li> </ul> <p><u>Technical Cooperation</u></p> <ul style="list-style-type: none"> <li>• Seafarers' Education Improvement Project (2003-2006)</li> <li>• Dispatch of long-term JICA experts (2003-2006)</li> <li>• Dispatch of short-term JICA experts (2003)</li> </ul>

## 2. Outline of the Evaluation Study

### 2.1 External Evaluator

Keishi Miyazaki, OPMAC Corporation

### 2.2 Duration of Evaluation Study

Duration of the Study: January 2014 – April 2015

Duration of the Field Study: April 6 – May 2, 2014, July 9 – 19, 2014

## 3. Results of the Evaluation (Overall Rating: C<sup>4</sup>)

### 3.1 Relevance (Rating: ③<sup>5</sup>)

#### 3.1.1 Relevance to the Development Plan of Indonesia

At the time of appraisal of this project in 2001, the Indonesian National Development Plan (PROPENAS) (2000-2004) indicated the cross-sectoral five development priorities as being (i) developing a democratic political system and maintaining national unity and cohesion, (ii) realization of the supremacy of law and good governance, (iii) accelerating economic recovery and strengthening the foundation of sustainable and fair development on the basis of the people's economic system, (iv) developing social warfare, increasing the quality of religious life and cultural resilience, and (v) increasing regional development, as well as national development programs covering nine sectors<sup>6</sup> to deal with the development priorities of PROPENAS. In the national development programs for the education sector, reform of the education system was stipulated, including review and improvement of curricula in conformity with development needs at the local, national and global levels. As this project was aimed at

<sup>4</sup> A: Highly Satisfactory, B: Satisfactory, C: Partially Satisfactory, D: Unsatisfactory.

<sup>5</sup> ③: High, ②: Fair, ①: Low.

<sup>6</sup> The nine sectors are (1) law, (2) economy, (3) politics, (4) religious affairs, (5) education, (6) society and culture, (7) regional development, (8) natural resources and environmental management, and (9) defense and security.

improving Indonesian seafarers' education and training to meet the requirements of the STCW Convention defining the minimum skills and capacities of seafarers to prevent accidents at sea, the project was consistent with PROPENAS. Also the Ministry of Transport set the development of Indonesian seafarers in compliance with STCW95 as one of the most important priority issues in transport sector policy. The Education and Training Agency (ETA) (currently the Transportation Human Resources Development Agencies (THRDA)) and the Directorate General of Sea Transportation setup a taskforce and worked for the development of a related legal framework and the establishment of manuals that met the requirement of STCW95 in the related organizations and METIs.

At the time of the ex-post evaluation, the National Medium Term Development Plan of Indonesia (RPJMN) (2010-2014), which was the Five-Year National Development Plan of Indonesia, set eleven national priorities. These were (i) bureaucracy and government reform, (ii) education, (iii) health, (iv) poverty reduction, (v) food resilience, (vi) infrastructure, (vii) investment and business climates, (viii) energy, (ix) environment and disaster management, (x) least developed, frontier, outer and post-conflict areas, and (xi) culture, creativity, and technological innovation. Since this project is aimed at educating qualified seafarers to satisfy international conventions through the upgrading of maritime education in Indonesia, the project objective is still consistent with the development priority of RPJMN "(ii) education".

At the time of the ex-post evaluation, Indonesia was continuously authorized by IMO as a country that satisfies international standards in line with STCW, and Indonesia fully met the requirements of STCW95. Currently, the Indonesian government has been working on the establishment of a related legal framework and manuals in related organizations and METIs that respond to the requirement of STCW2010 amended in 2010.

### 3.1.2 Relevance to the Development Needs of Indonesia

In Indonesia, which is the world's largest archipelagic nation, marine transport is a major industry and plays an important role in supporting employment opportunities and foreign currency earning. Therefore, strengthening the capacities of METIs which provided seafarers' education was expected.

At the time of appraisal of this project, seven government METIs: three merchant marine polytechnics, one merchant marine college and three merchant marine schools (rating school), existed under the Education and Training Agency (ETA) (currently the Transport Human Resource Development Agency (THRDA)), which was in charge of public seafarers' education. An additional three merchant marine schools were in preparation. In order to meet the requirements of STCW95, it was necessary for Indonesia to respond to the following issues: (i) the establishment of related laws, regulations and manuals, (ii) the introduction of advanced training equipment in METIs such as radar/ARPA simulators, ship maneuvering simulators and engine room simulators as well as reinforcement of existing training equipment, (iii)

development of new education and training programs by utilizing simulators in compliance with IMO model courses, and (iv) training for instructors/trainers who use simulators and for technicians who take care of the maintenance of training equipment in METIs. Regarding (i), the necessary actions had been already taken by ETA and the respective agencies. Regarding (ii), (iii) and (iv), however, the appropriate actions had not been fully taken in the six target METIs. Particularly, the Merchant Marine College (BP3IP) in Jakarta, which specializes in upgrading education for seafarers had only a small amount of advanced training equipment, and the installation of new advanced training equipment in BP3IP was an urgent issue.

At the time of the ex-post evaluation, Indonesia held 77,727 seafarers (in 2010) which was the fourth largest number of seafarers after China, Turkey, the Philippines, and which counted for 5.9% of the total number of seafarers in the world<sup>7</sup>. This contributed to the creation of employment opportunities and foreign currency earning, and the importance of supporting the Indonesian marine transport sector and maritime education and training institutions has remained high.

At the time of ex-post evaluation, the six target METIs of this project had already provided the relevant seafarers' education and training in compliance with STCW95 after the introduction of training equipment and the reform of curricula by implementing various measures, including this project. Since January 2012, the six target METIs have been conducting necessary preparations such as reviewing and updating the existing education curricula<sup>8</sup> and the procurement of additional training equipment in order to satisfy the requirements of STCW2010, such as additional and modified qualifications for seafarers. It is expected that the six target METIs will complete the necessary actions by the end of 2014.

### 3.1.3 Relevance to Japan's ODA Policy

At the time of appraisal of this project, the Japanese Government Country Assistance Policies for Indonesia (2001) had the following five priority areas: (i) fairness, (ii) human resource development and education, (iii) environmental protection, (iv) reform of industrial structure, and (v) economic infrastructure. The objective of this project was consistent with the priority area of "(ii) human resource development and education". Also JICA's Country Assistance Strategy for Indonesia, established in September 2000, mentioned the necessity of assistance for school infrastructure development for seafarers' education that was requested by the international conventions. Therefore, the objective of this project was in line with the above JICA strategy.

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<sup>7</sup> According to the latest IMO statistics in 2010, the total number of seafarers in the world was 1,316,606. The major nationalities were: China (141,807), Turkey (87,743), the Philippines (81,180), Indonesia (77,727), Russia (65,000), and India (62,672).

<sup>8</sup> The new curricula of METIs in compliance with STCW2010 are defined by the Regulations of Transport Human Resource Development Agency, the Ministry of Transport (Regulations of the Head Transport Human Resources Development Agencies No. SK 2126/HK.208/XI/DIKLAT-2010 regarding Guidance of Maritime Education and Training Implementation).

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

### 3.2 Effectiveness<sup>9</sup> (Rating: ②)

#### 3.2.1 Quantitative Effects (Operation and Effect Indicators)

The aim of the project was to enable the six target METIs to conduct the relevant seafarers' education and training to satisfy the requirements of STCW95 by reviewing and improving the existing education and training curricula, developing instructors' capacity, installing simulation-type training equipment, and constructing training facilities. In addition, it was expected that the project would contribute to securing employment opportunities for Indonesian seafarers at shipping companies including foreign shipping companies, to improving the safety of marine transport, and to increasing the opportunities for foreign currency earning by educating and producing qualified seafarers who satisfy the requirements of STCW95.

Table 1 shows the list of training equipment installed by the project and the allocation for the six target METIs. BP3IP where little training equipment had been available received the most equipment. The remaining five METIs received necessary equipment after an examination of overlaps with existing equipment.

Table 1: Allocation of Training Equipment for each METI by the Project

Equipment	BP3IP	STIP Jakarta	PIP Semarang	PIP Surabaya	PIP Makassar	BP2IP Barombong
Radar/ARPA Simulator <sup>(Note 1)</sup>	X			X		X
Ship Maneuvering Simulator			X		X	
Engine Room Simulator	X		X		X	
Diesel Engine Plant Simulator	X					
GMDSS Simulator (incl. PC base) <sup>(Note 2)</sup>	X	X	X	X		X
Navigation Aids Simulator	X					
Engine Workshop Equipment	X					
PC based Cargo Handling Simulator					X	X
Cargo Oil Handling Simulator	X		X		X	
LNG Cargo Handling Simulator	X					
Inner Gas System			X	X		X
Automatic/Control Equipment	X					
Basic Safety Equipment	X	X	X	X	X	X
Tanker Cleaning Machine Trainer		X	X	X	X	X
Solid Floatation Oil Booms						X
Oil Recovery Devices						X
Physics and Chemistry Laboratory Equipment	X	X	X		X	
Language Laboratory	X	X			X	X

Source: Project Completion Report.

Note 1: ARPA: Automatic Radar Plotting Aids

Note 2: GMDSS: Global Maritime Distress and Safety System

<sup>9</sup> Sub-rating of Effectiveness is to be put with consideration of Impact.

Table 2 shows the proportion of the project equipment to the total training equipment in the six target METIs. Seventy percent of the major training equipment in BP3IP was introduced by the project. Meanwhile, the proportions of the project equipment in STIP Jakarta and PIP Surabaya were less than 10% of the total of the major training equipment.

Table 2: Proportion of the Project Equipment to the Total Training Equipment

School	Proportion of the Project Equipment to the Total Training Equipment
BP3IP	70%
STIP Jakarta	9%
PIP Semarang	20%
PIP Surabaya	7%
PIP Makassar	30%
NP2IP Barombong	19%

Source: Response to the questionnaire.

Differences in the utilization of project equipment were observed at the time of the ex-post evaluation. On one hand, no major problems were seen in the utilization of project equipment in BP3IP and STIP Jakarta, on the other hand, some equipment was not fully utilized in PIP Semarang, PIP Surabaya, PIP Makassar, and BP2IP Barombong due to breakdowns and malfunctions of the machinery and systems (See **“3.5.4 Current Status of Operation and Maintenance”** for detailed information on the status of the equipment with problems).

#### (1) Annual Operation Hours of Training Equipment

At the time of the appraisal of this project, targets had been set for the annual operation hours of major training equipment after project completion including those for GMDSS simulators, radar/ARPA simulators, ship maneuvering simulators, and engine room simulators. Table 3 indicates the annual operation hours of these four types of simulators at each school. The annual operating hours per one set of equipment of each simulator in 2010-2013 have not yet achieved their respective targets. The main reasons are: (i) the operation of some equipment was suspended or frequency of utilization reduced due to breakdowns and malfunctions of the equipment, (ii) there were changes in the operation hours of equipment according to modifications of training curricula and increases/ decreases in the number of students, (iii) some schools reduced the utilization of project equipment because the transfer of ownership of the project equipment had not been completed.

Table 3: Annual Operation Hours of the Project Equipment

Unit: Annual operating hours per one set of equipment

Type of Equipment / School	Target (Project Completion)	Actual		
		2011 (Project Completion)	2012 (1 year after Project Completion)	2013 (1 year after Project Completion)
(1) GMSDD Simulator				
BP3IP	887	148	158	211
STIP Jakarta		205	273	702
PIP Semarang		9	24	14
PIP Surabaya		364	364	364
BP2IP Barombong		Operation has been suspended due to breakdown		
(2) Radar/ARPA Simulator				
BP3IP	1,040	386	75	166
PIP Surabaya		110	116	118
BP2IP Barombong		Operation has been suspended due to breakdown		
(3) Ship Maneuvering Simulator				
PIP Semarang	879	173	58	535
PIP Makassar		352	240	620
(3) Engine Room Simulator				
BP3IP	1,364	260	570	630
PIP Semarang		239	100	904
PIP Makassar		92	92	505
BP2IP Barombong		86	180	280

Source: JICA appraisal documents, Project Completion Report, and Response to the questionnaire.

Note: Regarding GMDSS Simulator and Radar/ARPA simulator, usually one set of equipment for instructors and 2-3 sets of equipment for students are installed as one system.

Regarding (i), for example, BP2IP Barombong has suspended the operation of the GMDSS simulator and the radar/ARPA simulator since 2011 due to problems with the software. PIP Semarang restricted the use of the GMDSS simulator due to problems with instructor's monitor.

Regarding (ii), for example, BP3IP and STIP Jakarta set the planned training hours for the GMDSS simulator as 529 hours<sup>10</sup> based on their annual training curriculum. Compared with this figure, at least the actual operation hours of GMSDD simulator in 2013 in STIP Jakarta, which were 702 hours, fully met the above planned training hours. It was found that there were differences between the target operation hours of each piece of equipment estimated at the time of appraisal and the planned training hours at each school based on their annual training curricula. However, it was difficult to verify detailed information on the assumptions and preconditions of how to calculate the target annual operation hours for each piece of equipment at the time of appraisal. Therefore, this ex-post evaluation could not conduct detailed analysis on the differences between the planned and actual figures.

Regarding (iii), none of the target schools were able to execute the operation and

<sup>10</sup> 74 hours (planned training hours for a one unit of GMDSS simulator training course) x 8 hours x 8 courses/year= 592 hours/year.

maintenance budget for the project equipment because the ownership of the project equipment still belonged to THRDA and had not been transferred to each school at the time of ex-post evaluation. For this reason, PIP Semarang and PIP Surabaya regulated the utilization of the project equipment. Furthermore, the delay in the transferring of ownership negatively influenced the operation, maintenance and management of the training equipment (See “**3.5.3 Financial Aspects of Operation and Maintenance**” for detailed information). According to THRDA, there are plans to complete the procedure for transferring ownership of the project equipment from THRDA to the six target METIs by the end of 2014 <sup>11</sup>.

In addition to the training equipment provided by this project, each school has similar types of simulators introduced with the assistance of the Indonesian government and other donors, and classes have been conducted utilizing both project equipment and similar types of other equipment as supplements to each other. These similar types of training equipment are mostly computer-based simulators. For example, when it is difficult to utilize the real type of GMDSS simulator introduced by the project due to mechanical problems, the instructors have taught the theory of the GMDSS simulator to students utilizing the computer-based GMDSS simulator first<sup>12</sup>, going on to explain how to practically use the simulator by showing and demonstrating with the real type of GMDSS simulator. For this reason, even if the annual operation hours of the training equipment do not reach the targets shown in Table 3, each school has made efforts to fulfill the required hours for practical training based on the annual training curriculum by utilizing a combination of the project equipment and similar types of other equipment.

- (2) Number of Fulltime Students who received STCW95 Compliant Training and have obtained a Certificate of Competency in compliance with STCW95

The seafarers’ education and training program in Indonesia consists of two programs: (i) seafarers’ competency education and training program for the specialized subjects<sup>13</sup> necessary

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<sup>11</sup> In 2012, THRDA submitted a proposal to the Ministry of Transport (MOT) for transferring the property rights of training equipment from THRDA to METIs. The response to the proposal by MOT was that the transfer of property was allowed only after THRDA had made the appropriate repairs of broken and damaged equipment. Therefore, THRDA made an effort to secure and execute the necessary maintenance budget for the repair works. However, THRDA could not obtain the necessary budget due to the prolonged and complicated budget application procedures in MOT, e.g. the detailed examination and comments made on the cost estimation of maintenance by the inspector general. In 2014, THRDA submitted a proposal to MOT again for transferring the property rights of training equipment, and this was in process in MOT at the time of ex-post evaluation.

<sup>12</sup> When utilizing the real type of GMDSS simulators for classes, usually one set of equipment for instructors and 3 sets of equipment for students are utilized simultaneously as one simulation system. Therefore, the number of students who can practice on-hands training of real type of GMDSS simulators for one class is limited. Meanwhile, when utilizing computer-based GMDSS simulators, the number of students who can study the GMDSS simulator for one class is the same as the number of computer terminals, which is usually 20-30.

<sup>13</sup> For example, the specialized subjects are navigation, ship operation, and maritime law for the deck department, and marine meteorology, marine engines, electrical and electronics engineering, machine work, and measurement control for the engine department.

for obtaining seafarers certificates<sup>14</sup>, and (ii) seafarers' proficiency education and training program for the certificates of the technical skills and qualifications required for each type of duty. The seafarers' competency education and training program includes one year on-board training. The seafarers' proficiency education and training program includes the following practical training which conducted utilizing simulators: on ship security, GMDSS, radar simulation, tanker familiarization, engine room, firefighting training, medical care and maritime English.

Table 4 indicates the number of fulltime students on STCW95 compliance training to obtain certificates of competency. Looking at the actual figures in 2010-2013, the actual total figure in 2013 was 20,931 against the target total figure of 9,333, which fully met the target as it was more than twice the target figure. While the largest factor contributing to this achievement was that each school expanded its number of students, it is also considered that the project has also contributed to the above achievement to some extent, since the project equipment as well as school buildings constructed by the project at each school were utilized for the seafarers' competency education and training program.. At the same time, considering that other training equipment was utilized for this program and that the proportion of project equipment among the total equipment used in STIP Jakarta and PIP Surabaya was less than 10 percent, there are also factors which contributed to the above achievement, other than the project. Regarding deck watch rating and engine watch rating, actual figures did not reach their respective targets in some years. This is because competency education and training courses for deck watch and engine watch rating are integrated into the competency education and training courses for deck and engine rating at the respective schools as a result of change of their educational program. Therefore, if the comparison is made between the actual and target figures in terms of sum number of "deck watch and engine watch rating" and "deck and engine rating", the actual figures fully meet the target figures.

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<sup>14</sup> The seafarers' certificates of the deck and engine departments are classified into five grades (from first to fifth grade) according to the tonnage and engine power outputs. For deck officers, the first, second and third deck officers (DOC I, DOC II, DOC III) are able to go on unlimited voyages including international voyages, the fourth grade deck officers (DOC IV) can go on near coastal voyages, and the fifth deck officers (DOC V) are able to go on near costal and local voyages. For engine room officers, grades are categorized according to the engine power outputs of ships. In addition, there are certificates of ratings who work under deck and for engine room officers.

Table 4: Number of Fulltime Students on STCW95 Compliant Training to obtain Certificate of Competency

Unit: Number of persons

Type of Certificate	Base line (2000)	Target (Project Completion)	Actual		
			2011 (Project Completion)	2012 (1 year after Project Completion)	2013 (1 year after Project Completion)
<b>Deck Department</b>					
1. Deck Officer Class-I	62	240	393	544	542
2. Deck Officer Class-II	234	474	629	782	594
3. Deck Officer Class-III	1,141	1,462	1,215	1,612	1,696
4. Deck Officer Class-IV	164	330	678	874	704
5. Deck Officer Class-V	197	360	1,808	3,053	3,877
6. Deck Rating	60	540	2,219	3,904	4,084
7. Deck Watch Rating	240	1,380	1,519	1,074	731
<b>Engine Department</b>					
8. Engineer Officer Class-I	33	240	352	447	439
9. Engineer Officer Class-II	194	390	546	704	661
10. Engineer Officer Class-III	1,070	1,337	1,232	1,579	1,627
11. Engineer Officer Class-IV	150	300	616	747	682
12. Engineer Officer Class-V	155	360	1,267	1,987	2,592
13. Engine Rating	60	540	2,030	2,039	2,233
14. Engine Watch Rating	240	1,380	1,035	580	469
<b>Total</b>	<b>4,000</b>	<b>9,333</b>	<b>15,539</b>	<b>19,926</b>	<b>20,931</b>

Source: JICA appraisal documents and Response to the questionnaire.

Note: The competency education and training courses for deck watch rating and engine watch rating are integrated with competency education and training courses for deck and engine rating. METIs have not received applications from new students for the deck watch and engine watch rating courses since 2012. The deck watch and engine watch rating courses are scheduled to end in 2014 when the existing cadets (students) graduate these courses.

### (3) Number of Graduates who passed STCW95 Compliant National Examinations

Table 5 indicates the number of graduates who passed STCW95 compliant national examinations in the six target METIs. The actual total figure in 2013 was 20,895 against the total target figure of 9,323, which fully met the target as it was more than twice the target figure. It is considered that the project contributed to this achievement to some extent, but other factors also made notable contributions. The reason for this is as same as the reason that explained in the case of number of fulltime students on STCW95 compliant training to obtain certificate of competency.

Table 5: Number of Graduates who passed STCW95 Compliant National Examinations conducted by the Board of State Examination and Certificate for Seafarers (DPSK)

Unit: Number of person

Type of Certificate	Base line (2000)	Target (Project Completion)	Actual		
			2011 (Project Completion)	2012 (1 year after Project Completion)	2013 (1 year after Project Completion)
<b>Deck Department</b>					
1. Deck Officer Class-I	41	238	339	470	572
2. Deck Officer Class-II	223	473	574	710	659
3. Deck Officer Class-III	1,141	1,462	1,198	1,606	1,847
4. Deck Officer Class-IV	164	330	758	975	786
5. Deck Officer Class-V	192	359	1,385	2,920	3,571
6. Deck Rating	55	538	2,219	3,904	4,063
7. Deck Watch Rating	240	1,380	1,536	1,072	746
<b>Engine Department</b>					
8. Engineer Officer Class-I	26	239	320	416	466
9. Engineer Officer Class-II	194	390	471	776	702
10. Engineer Officer Class-III	1,070	1,337	1,226	1,587	1,609
11. Engineer Officer Class-IV	150	300	659	853	746
12. Engineer Officer Class-V	153	359	1,038	1,940	2,421
13. Engine Rating	59	538	1,206	2,039	2,233
14. Engine Watch Rating	240	1,380	939	565	474
<b>Total</b>	<b>3,948</b>	<b>9,323</b>	<b>13,868</b>	<b>19,833</b>	<b>20,895</b>

Source: JICA appraisal documents and Response to the questionnaire.

Note: The competency education and training courses for deck watch rating and engine watch rating are integrated with competency education and training courses for deck and engine rating, and METIs have not received applications from new students for the deck watch and engine watch rating courses since 2012. The deck watch and engine watch rating courses are scheduled to end in 2014 when the existing cadets (students) graduate these courses.

The national examinations for seafarers' certificates of competency are conducted four times a year, and the examination contains six subjects. The examinees are entitled to apply for the national examination four times consecutively, and those subjects which are passed can be carried over to the next examination until the fourth time. Generally most graduates from the six target METIs were able to pass the examination successfully within the four attempts.



National Examination of Seafarers conducted in PIP Makassar

### 3.2.2 Quantitative Effects

#### (1) Response to the requirements of STCW95

The aim of STCW95 was to improve the capacity of seafarers through improvements in institutional and personal aspects including the development of related laws and regulations,

clarification of the required seafarers' education curricula and seafarers' qualifications, and upgrading seafarers' quality in order to reduce accidents at sea which have been mainly caused by human error. The important characteristic of STCW95 was that a higher priority was given to the acquisition of practical skills and techniques backed by theoretical knowledge than the conventional seafarers' training focused on theoretical studies. The Indonesian government had been working on the improvement and reform of the legal and institutional aspects in line with STCW95 with the assistance of JICA experts<sup>15</sup>.

Based on the above initiatives, this project implemented the following hardware and software assistance to the six target METIs in order that they could provide the relevant seafarers' education and training in compliance with STCW95: (i) introduction of several IMO model courses for seafarers proficiency education and training programs which were missing in total 35 IMO model courses, (ii) training for instructors on the operation, maintenance and management of simulators, and (iii) the introduction of simulators, construction of new school buildings, and the rehabilitation of school facilities to be utilized for simulator classes (See **"3.4.1 Project Outputs"** for detailed information).

According to interview with THRDA and the six target METIs, it was confirmed that the capacities of the six target METIs in implementing the relevant seafarers education and training in compliance with STCW95 had been strengthened through the implementation of this project. In particular, it is considered that the project effects were more notable in BP3IP than the other schools, because it had only a small amount of advanced training equipment such as simulators available before project implementation, but now has received most types of simulators from the project. At the time of the ex-post evaluation, Indonesia was listed with the countries authorized by IMO for the fulfillment of international standards based on the STCW Convention. This means that Indonesia has satisfied the requirements of STCW95.

In addition, the education and training program, which was one of the project components, was intended to improve the levels of Indonesian seafarers' education to a higher standard than the requirements of STCW95 (so called "STCW95 plus Alpha"). Therefore, the project planned and implemented (i) the introduction of teaching methods for the skill improvement of instructors, (ii) the improvement of assessment methods for instructors, (iii) the development of teaching guidelines including manuals and teaching materials, and (iv) overseas training programs including training for Bridge Resource Management (BRM) and Engine Room Resource Management (ERM). The contents of the education and training program have helped the six target METIs to prepare for STCW2010. For example, STCW2010 added qualifications in communication ability, including communication skills and leadership, as a measure for

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<sup>15</sup> For example, the technical cooperation project "Seafarers Education Improvement Project (2003-2006)" and the dispatch of JICA experts to THRDA, MOT (dispatch of long-term JICA experts (2003-2006), and dispatch of short-term JICA experts (2003)).

accident prevention. Bridge Resource Management (BRM) and Engine Room Resource Management (ERM) are one of the above qualifications, and training for BRM and ERM were already included in the subjects of the overseas training programs under the education and training program of this project. Also a qualification for GMDSS radio operators, which was not clearly defined in STCW95, was added by STCW2010. In response to this, PIP Surabaya established new training courses for electrical engineers and electrical technicians as one of seafarers' proficiency certificates for the engine department. As practical training with GMDSS and ARPA simulators are compulsory for the certificates of electrical engineers and electrical technicians, the simulators introduced by the project have been utilized for these training courses. Furthermore, STCW2010 demands the use of full mission type (real type) simulators for seafarers' proficiency education and training programs. However, it is not necessary for BP3IP to make additional investment for this requirement as BP3IP has already installed full mission type simulators through this project. According to BP3IP, they recognized that they were able to respond to the requirements of STCW2010 smoothly because they could successfully meet the requirements of STCW95 through the implementation of this project.

At the time of ex-post evaluation, there were ten government maritime education and training institutions (METIs) including five Merchant Marine Polytechnics, one Merchant Marine College, one Sea Transportation Education and Training College<sup>16</sup>, and three Merchant Marine Schools. There were also 93 private schools in the Indonesia seafarers' education sector. Generally the government METIs are superior to the private schools in terms of the quantity and variety of training equipment, the quantity and quality of instructors, and the sufficiency of their educational programs. Also the seafarers' competency education and training programs for the advanced level of officers, such as first and second officers, (DOC/EOC I and II) are only available at the government METIs. Furthermore, the government METIs have played a leading role in the Indonesian seafarers' education sector by providing technical assistances and lending advanced simulators to the private schools. In that sense, the project has had a positive influence on the entire seafarers' education sector in Indonesia as private schools were expected to indirectly enjoy the benefits of the project through capacity improvement of seafarers' education and training in the six target METIs.

## (2) Improvement of Educational Level in the Six Target METIs

This ex-post evaluation conducted a beneficiary survey<sup>17</sup> (sample size: 110) with

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<sup>16</sup> Sea Transportation Education and Training College (BPPTL), Jakarta, specializes in education of policy issues for Indonesian government officers engaged in the marine transport sector, and it does not provide seafarers' education and training in general.

<sup>17</sup> The ex-post evaluation conducted the beneficiary survey targeting current students, graduates and instructors in the six target METIs, and shipping companies. The total number of interviewees were 110 and the breakdown was: 38 current students (5-7 person/school), 31 graduates (4-6 persons/school), 31 instructors (5-6 persons/school), and

instructors, current students, graduates and shipping companies in order to find out the project effects on the improvement of the educational level in the six target METIs. Normally, analysis of changes in education level should be made by comparing the situation before and after project implementation. However, there were few people who knew the education levels both in 2000 and before project implementation as well as those after project completion in 2011, except some instructors who had been working for the same school continuously for more than 15 years. Therefore, this beneficiary survey firstly examined the perceptions of interviewees about whether or not the educational level of the target schools, including the capacity of instructors and students and the contents of educational programs, were better than the other schools. If the result of this was positive, further analysis took place on whether or not this positive result could be attributed to the project.

In addition to this beneficiary survey, as a supplement, interview surveys were conducted with 18 instructors of BP3IP who had participated in the overseas training programs conducted by this project and who had been working for BP3IP continuously at the time of ex-post evaluation. Based on the results of these interview surveys, analysis was made on the effects on improvements of instructors' capacity as a result of the overseas training programs and on capacity improvements of students and graduates in comparison with the situations of pre and post project implementation.

#### Improvement in Capacity of Instructors

According to the results of beneficiary survey, 93% of respondents (84% of instructors, 97% of students, 100% of graduates, 90% of shipping companies) answered that the capacity of instructors in the six METIs were better than in other schools. The major reasons raised by the respondents were: (i) instructors had seafarers' certificates, (ii) instructors had knowledge and experience in the maritime field or as seafarers, (iii) instructors had already received training to implement the seafarers' education and training in compliance with the STCW Conventions, and (iv) some of the instructors taught in other maritime schools including private schools. Also, 81% of respondents except shipping companies were satisfied with the capacity of instructors (very much satisfied: 22%, satisfied to some extent: 59%).

When asking only instructors about the improved aspects of instructors' capacity, the major responses were as follows: (i) how to develop educational and training courses in line with STCW95 (74% of responses), (ii) skills and knowledge of the new subjects (58%), (iii) teaching skills (55%) and (iv) how to operate and maintain the new equipment (45%) (multiple answers allowed).

The interview survey results from 18 instructors of BP3IP indicated that all 18 respondents

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10 shipping companies. Principally, the beneficiary survey was conducted with a face-to-face interview utilizing a structured interview sheet. However, some graduates were asked to complete the interview sheet by themselves and submit them through e-mail.

recognized the improvement in their capacity through participation in the overseas training programs. Their main responses about improved aspects of instructors' capacity were (i) skills and knowledge of the new subjects (67%), (ii) teaching skills (61%), (iii) how to develop the educational and training course in line with STCW95 (61%), (iv) operation skills of simulators (44%) and (v) how to operate and maintain the new equipment (39%) (multiple answers allowed). These results were almost same as the results of the beneficiary survey regarding the improved aspects of instructors' capacity in the six METIs. All 18 instructors of BP3IP answered that they utilized the skills and knowledge acquired in the overseas training programs for teaching. In the beneficiary survey results, "(iii) instructors already received training to implement the seafarers' education and training in compliance with the STCW Conventions", and "(iv) some of instructors taught in other maritime schools including private schools" were listed as reasons why the instructors of the six METIs were better than at other schools. It is assumed that the capacity development training for instructors by the project and its outcome may be the background to the above two responses.

#### Improvement in Capacity of Students and Graduates

According to the results of beneficiary survey, 92% of respondents (87% of instructors, 89% of students, 97% of graduates, 100% of shipping companies) answered that the capacity of current students and graduates in the six METIs were better than at other schools. The major reasons given by the respondents were: (i) student and graduates mastered theory and practice supported by an appropriate curriculum and complete training equipment, (ii) all skills and knowledge acquired from school could be implemented in the work place<sup>18</sup>, and (iii) plenty of shipping companies wanted to recruit graduates from the six METIs because of their high quality.

The interview survey results with 18 instructors of BP3IP indicated that they recognized that the capacity of students and graduates had improved comparing the situation before and after project implementation. Their main responses about the possible reasons for this improvement were: (i) improvement in the capacity of instructors (83%), (ii) improvement in education and training programs (61%), (iii) improvement of training equipment (56%), (iv) increase in the number of instructors against the number of students (33%), and (v) improvement of other educational facilities such as libraries (28%) (multiple answers allowed).

Needless to say, the capacity of students and graduates largely depends on their individual qualifications and their own efforts. At the same time, the improvement of the educational environment in the six METIs by the project through educational curriculum improvement, the

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<sup>18</sup> Since the training equipment introduced by the project was designed in consideration of practicality, the project provided the full mission type simulators as same as the real equipment utilized on board. Therefore, many students and instructors commented that the seafarers' proficiency education and training program utilizing the real type of simulators was very useful for practical work place as the skills and knowledge learned in the school could be easily applied when working on board.

installation of training equipment, and the construction and rehabilitation of school buildings must have contributed to helping students to master the practical knowledge and skills necessary for seafarers to some extent. It is assumed that this may be the background to the responses to (i), (ii) and (iii) for reasons why the capacity of current students and graduates in the six METIs were better than at other schools.

From the viewpoint of shipping companies, 50% of shipping companies highly evaluated “adaptability” and “personality” of graduates, but the majority of shipping companies rated the “technical skills”, “knowledge” and “foreign language ability” of graduates as moderate. As employers of seafarers with a variety of nationalities, they thought that there was room for improvement in the capacity of Indonesian seafarers in comparison with seafarers of the Philippines, India and Eastern Europe. On the one hand, shipping companies evaluated the usefulness of the seafarers’ proficiency training program utilizing full mission type simulators. They did, however, request that the six METIs to increase the training hours for proficiency training courses that utilized simulators since the existing average training hours per student are very limited. In addition, the demand of shipping companies for improving foreign language ability of students satisfying the international standards was high.

#### Improvement of the Education and Training Programs

According to the results of beneficiary survey, 100% of respondents answered that the education and training programs in the six METIs were better than at other schools. The main reason raised by the respondents was that the contents of the curricula and certificates provided by the six METIs were compliant with IMO conventions and international standards including STCW. 87% of respondents, except shipping companies, were satisfied with the education and training programs of the six METIs (very much satisfied: 24%, satisfied to some extent: 63%). This project supported improvement of curricula corresponding to STCW95 including the development of proficiency education and training courses based on IMO model courses. It is assumed that this may be the background to the responses that education and training program in the six METIs were better than other schools.

Based on the results of beneficiary survey and the interview survey with instructors of BP3IP participating in the overseas training programs, it can be concluded that the project has contributed to improvements in the capacity of instructors, the capacity of students and graduates, and education and training programs in the six METIs to some extent. Therefore, it is considered that the project has contributed to the improvement of educational levels of the six METIs to some extent.

### 3.3 Impact

#### 3.3.1 Intended Impacts

##### (1) Securing Employment Opportunities for Indonesian Seafarers

Every year, the six target METIs have accepted recruitment missions from shipping companies including domestic and foreign companies, and shipping companies have been active in employing excellent students as well as accepting students for on-board training<sup>19</sup> from the six METIs.

According to the results of beneficiary survey, instructors, students, and graduates gave the following answers about the most necessary qualifications and capacity for employment by foreign shipping companies: seafarers' certificates (44%), academic qualification (25%), and foreign language ability (23%). Shipping companies answered the same question with seafarers' certificates (44%), adaptability (44%), and foreign language ability (11%). As the graduates of the six METIs hold the appropriate seafarers' certificates in compliance with STCW95, and, according to the schools, most of them are employed by the domestic and foreign shipping companies. It is assumed, therefore, that the project has contributed to securing employment opportunities for Indonesia seafarers to some extent.

However, job hunting activities of graduates are basically carried out on an individual basis, and schools do not have enough information on the employment situation of their graduates as they have not conducted any follow-up survey. Therefore, it was difficult to verify the project impact on securing employment opportunities for graduates from the six METIs based on the quantitative data.

##### (2) Improvement in the Safety of Marine Transport

According to the results of the beneficiary survey, all instructors, students, graduates and shipping companies replied that the education and training program of the six METIs contributed to improvements in the safety of marine transport. The main reason given by the respondents was that contents of the curricula and certificates provided by the six METIs were compliant with IMO conventions and international standards including STCW<sup>20</sup>. THRDA, the executing agency of the project, also recognized that graduates were on board as seafarers and were actually working for the prevention of marine accidents at their respective work places

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<sup>19</sup> It is compulsory for the third grade students to practice one year on-board training in the target METIs. However, since none of six target METIs have their own training ships, the one year on-board training has been conducted in cooperation with shipping companies. Since accepting trainees is an opportunity for shipping companies to find good students through on-board training and to recruit them before graduation, the shipping companies accept the trainees from the government METIs including the six target schools preferentially. For example, in many cases the shipping companies pay the tuition fees of good students for their fourth academic year under the condition that those students must be employed by the sponsoring shipping companies after graduation. However, the number of trainees accepted by the shipping companies is still less than the number of trainees who should receive on-board training, and some students are obliged to wait for a few months to one year for on-board training..

<sup>20</sup> For example, the practical training and proficiency certificates for ship maneuvering skills, operation skills of ARPA, GMDSS, oil and LNG tankers utilizing simulators defined by STCW are necessary for the safety of navigation and marine transport.

after having received practical education and training and acquired the relevant knowledge and skills for the prevention of marine accidents through learning with the training equipment and school facilities provided by the project. THRDA thought that this contributed to the improvement of safety in marine transport. In the light of above, it is assumed that this project has contributed to improvement in the safety of marine transport to some extent.

### (3) Promotion of Opportunities for Foreign Currency Earning.

This project anticipated the economic impact of foreign currency earning by securing the employment of graduates from the six METIs at foreign shipping companies. The ex-post evaluation examined a trial calculation of the expected total salaries of graduates from the six METIs in 2001-2013 by utilizing the following information and data: the number of graduates who passed the STCW95 compliant national examination (2001-2013) as shown in Table 5; the interview results with graduates; and the recommended minimum wage for seafarers by the International Transport Worker's Federation (ITF)<sup>21</sup> based on the recommended minimum wage for seafarers by IMO. The result of this trial calculation was 487 million US dollars in total<sup>22</sup>. Provided that graduates remitted a half of their salaries in foreign currency to Indonesia, it was also calculated that Indonesia received 243 million US dollars in total in three years from 2011 to 2013. However, these trial calculations did not include the expected foreign currency earning by graduates who worked for foreign shipping companies after they attended the seafarers' proficiency education and training program only<sup>23</sup>.

In the light of above, it is assumed that this project has contributed to the promotion of opportunities for foreign currency earning to some extent.

## 3.3.2 Other Impacts

### (1) Impacts on the Natural Environment

At the time of appraisal of the project, this project was categorized as type B in the JBIC Guidelines for the Confirmation of Environmental and Social Considerations (1999) since it was planned that the construction and rehabilitation works would be conducted within the existing school building and areas, and no major negative impacts on the natural environment

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<sup>21</sup> The minimum monthly wages including the overtime premium utilized for this circulation were USD 2,235 for DOC/EOC I, USD 1,790 for DOC/EOC II, USD 1,725 for DOC/EOC III, IV, V and USD 1,028 for rating.

<sup>22</sup> According to the trial calculation of the foreign currency impact conducted by the ex-post evaluation of the Japanese ODA loan project "Equipment Supply For Maritime Sector Training Program" in 2000, it applied the assumption that 50% of graduates would work for the foreign shipping companies. Also, according to the results of the beneficiary survey conducted by this ex-post evaluation, 15 out of 31 graduates interviewed were currently working for foreign shipping companies. Based on this information, the trial calculation made by this ex-post evaluation adopted the assumption that 50% of the graduates from the six target METIs are working for the foreign shipping companies. However, the actual wage of seafarers differs according to the individual shipping companies.

<sup>23</sup> Many students who only attend the seafarers' proficiency education and training courses already hold the respective seafarers' certificates, and some of them who participated in courses are employed by the shipping companies. Therefore, it was difficult to estimate how many of students who only attend seafarers' proficiency education and training courses were able to get a new jobs at foreign shipping companies after finishing the courses.

were foreseen. Also implementation of an Environmental Impact Assessment (EIA) was not compulsory under Indonesian domestic law. The ex-post evaluation confirmed that no negative impacts on the natural environment by the project were observed.

## (2) Land Acquisition and Resettlement

The project conducted the new construction of school buildings as well as the rehabilitation of school facilities to install training equipment. However, these works were completed within the existing school compounds and there was no land acquisition associated with this project.

The project conducted a temporary resettlement of ten households<sup>24</sup> living adjacent to BP3IP's compound because the project needed to use 250m<sup>2</sup> of land near BP3IP temporarily for transporting the construction materials for the new buildings and installation of training equipment. The temporary resettlement process was handled by the contractor in the way of individual compensation between the contractor and the households, and neither THRDA nor the Indonesian government were involved in this process. A possible reason for this was that the contractor decided to settle the resettlement process by individual compensation with households in order to avoid the risk of delay in the construction works due to delays in the of resettlement process. It was common that the resettlement process by the government organizations took longer. In addition, it is assumed that there was an advantage for resettled households to accept individual compensation with contractors because the compensation money proposed by the contractors was usually higher than that of the Indonesian government who applied the conditions for illegal occupants. According to the representative of the contractor who used to be in charge of resentment affairs, the compensation process with households was conducted based on communication and consensus with households through organizing meetings with households to explain the project objective and project outlines and the reasons and necessity for temporary resettlement, and achieving the understanding and consensus of households. This process was similar process to that required by Indonesian domestic law.

According to BP3IP, the resettled households used to be vendors who sold food and drinks to the students of BP3IP. However, after project completion, those households never came back to their original place, and currently other people live in simple apartments in their place. For this reason, it was difficult to verify the current living condition of the resettled ten households in the ex-post evaluation.

## (3) Unintended Positive/Negative Impact

None.

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<sup>24</sup> The resettled people lived in the place without the permission of the Jakarta city government (DKI Jakarta) who was the legal land owner. Therefore, the resettled people were so called illegal occupants.

Both the number of fulltime students on STCW95 compliant training to obtain certificates of competency and the number of graduates who passed the STCW95 compliant national examinations fully exceeded the respective targets. It was confirmed that the project contributed to the improvement of educational levels at the six METIs to some extent through the realization of the provision of seafarers' education and training in compliance with STCW95 by the six METIs. However, it is considered that not only this project but also other factors such as improvements in training equipment supported by the Indonesian government and other donors had a significant contribution to the above achievements. Meanwhile, the annual operation hours of major simulators of the project have not yet met the target because the operation of some simulators was suspended due to breakdown and malfunctions. The six METIs have made efforts to complete the required practical training based on the annual training curricula by utilizing a combination of the project equipment and similar types of other equipment. However, it is expected that the six METIs should conduct appropriate repair and maintenance of the equipment and fully utilize the training equipment of the project. It was confirmed that the project had positive impacts to some extent on securing employment opportunities for Indonesian seafarers, improving the safety of marine transport, and promoting opportunities for foreign currency earning as initially envisaged.

This project has somewhat achieved its objectives. Therefore, its effectiveness and impact is fair.

### 3.4 Efficiency (Rating:②)

#### 3.4.1 Project Outputs

The project outputs were composed of the following three components: (i) education and training program, (ii) procurement of training equipment, and (iii) civil works.

##### (i) Education and Training Program

##### Improvement of Seafarers' Education and Training Curricula in Compliance with STCW95

The education and training program was implemented during the final phase of the project for one year from July 2010 to June 2011. In this program, firstly a gap analysis was made on whether the existing training program and curricula of each METI satisfied STCW95 standards<sup>25</sup> (including the minor amendments of STCW in 1997, 1998, 2003, 2004, 2005, 2006) or not in terms of lectures, teaching subjects, and on-board training, etc. defined by the Decrees and Regulations of MOT. . Based on the results of the gap analysis, it was confirmed that the curricula for seafarers' competence education and training programs at the six METIs generally satisfied the requirements of STCW95. However, it was revealed that seafarers'

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<sup>25</sup> Chapter II: Master and deck department and Chapter III: Engine department in STCW95.

proficiency education and training programs at the six METIs only contained 16 IMO model courses out of 35 model courses stipulated by IMO, and that there was no maximizing use of the existing education and training equipment in the six METIs. For this, the project proposed that the executing agency to develop an additional 19 proficiency training courses which conformed to the IMO model courses as well as to improve existing 16 proficiency training courses. This proposal was accepted by the executing agency. At the time of ex-post evaluation, 35 proficiency training courses that meet the requirements of STCW95 have been conducted in the government maritime education and training institutions including the six METIs.

#### Response to STCW95 plus Alpha<sup>26</sup>

Indonesia targeted a goal to supply high qualified seafarers who had received good seafarers' education and training and to enjoy a leading position in the international seafarers market. For realizing the above goal, Indonesia wanted to improve seafarers' education in Indonesia to more than the required level by STCW95 which defined requirements for minimum skills and capacities of seafarers in order to prevent accidents at sea (so called "STCW 95 plus Alpha). Therefore, the project supported the improvement of teaching methods as a response to STCW95 plus Alpha in addition to the response to STCW95.

For example, the education and training program contained (i) the introduction of teaching methods for improving instructors' skills and knowledge, (ii) the improvement of methods of assessment of instructors' capacity, (iii) development of a variety of teaching guidelines such as manuals and teaching materials including a translation of the Japanese textbook "Theory and Practice of Ship Handling"<sup>27</sup> into Indonesian, and the development of a textbook for engine departments, the "Lesson Plan for Engine Workshop". The above activities were undertaken in Indonesia as well as in Japan through overseas training programs.

#### Overseas Training Programs

The overseas training programs were implemented targeting instructors and technicians at the six METIs who were responsible for the operation and maintenance of the project equipment. As overseas training programs were designed to respond to "STCW95 plus Alpha", they cover the following subjects and topics; skills improvement for ship maneuvering simulators and engine room simulators, Bridge Resource Management (BRM) and Engine Room Resource Management (ERM)<sup>28</sup>, and teaching methods and assessment methods for improving

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<sup>26</sup> "STCW95 plus Alpha" is a concept advocated by the Japanese government on the occasion of the International Maritime Conference organized in Japan in 2007. After this, this concept were disseminated to ASEAN countries and "STCW95 plus Alpha" became an indicator for improvement of seafarers' education (Project Completion report).

<sup>27</sup> "Emeritus Professor Kinzo Inoue (2011), Theory and Practice of Ship Handling", Seizando-Shoten Publication Co., Ltd.

<sup>28</sup> BRM and ERM were the risk management methods to secure ship security and safety of navigation through appropriate management and utilization of various resources in deck and engine room areas such as crew, equipment and information.

instructors' skills and knowledge in addition to operation and maintenance of simulators<sup>29</sup>. The actual total number of trainees who participated in the overseas training programs was 176, which was same as the planed (Table 6).

Table 6: Outputs of the Overseas Training Programs

Training Course		Person	Week	Batch	No. of Trainee	
					Deck	Engine
1	Ship Handling Simulator Training for Skills Improvement and Bridge Resource Management (BRM) (Simulator Course)	9	2	4	36	-
2	Engine Room Simulator Training for Skills Improvement and Engine Room Resource Management (ERM) (Simulator Course)	9	2	4	-	36
3	Assessment Method for Skills Improvement, and Introduction of Teaching Method for Skills Improvement (Non-Simulator Course)	20	2	4	40	40
4	Reinforcement of Operation and Maintenance Capability for Ship Handling and Engine Room Simulators (Non-Simulator Course)	6	2	4	12	12
Total					88	88
					176	

Source: Project Completion Report.

## (2) Procurement of Training Equipment

This project procured a variety of training equipment and simulators in line with STCW standards and installed them in the six METIs. Particularly, almost all types of training equipment were installed in BP3IP where little training equipment had been available. Necessary types of equipment were installed in other five METIs selectively considering the existing types and amount of equipment at each school. Table 7 indicates the planned and actual procured equipment, and there was a change in the amount of equipment as well as additional procurement of new types of equipment such as cargo oil handling simulators and LNG cargo handling simulators which were not planned in the original design. The reasons for the above modifications were: (i) review and updating of detailed design made in order to respond to the change of requirements associated with the amendment of STCW95 (as it took three years from completion of detailed design to procurement of equipment), and (ii) review and reexamination of the amount of equipment and target schools to avoid overlap with equipment already introduced by other projects. Since the above modifications were made in order to respond to environmental changes during the project implementation period and to avoid overlapping of

<sup>29</sup> In addition to the training courses for the operation and management of simulators under the overseas training programs, the manufacturers of simulators provided technical training and guidance for operation and maintenance of equipment in Indonesia as well as in Japan.

training equipment, the modification was justifiable.

Table 7: Planned and Actual Project Outputs (Procurement of Equipment)

Unit: Set

Item	Plan	Actual	Difference
Radar/ARPA Simulator (Note 1)	3	3	0
Ship Maneuvering Simulator	2	2	0
Engine Room Simulator	2	3	+1
Diesel Engine Plant Simulator	2	1	-1
GMDSS Simulator (incl. PC base) (Note 2)	4	5	+1
Navigation Aids Simulator	1	1	0
Engine Workshop Equipment (Lathe Machine, Milling Machine, Drilling Machine, Hack Sawing Machine, etc.)	1	1	0
PC based Cargo Handling Simulator	6	2	-4
Inner Gas System	6	3	-3
Automatic/Control Equipment	1	1	0
Basic Safety Equipment (Rescue Boat, Fire Detecting Systems, Fire Extinguishing Systems, Survival Suit, etc.)	6	6	0
Tanker Cleaning Machine Trainer	6	5	-1
Physics and Chemistry Laboratory Equipment	4	4	0
Language Laboratory	4	4	0
<Additional Outputs>			
Cargo Oil Handling Simulator	0	3	+3
LNG Cargo Handling Simulator	0	1	+1
Solid Flootation Oil Booms	0	1	+1
Oil Recovery Devices	0	1	+1

Source: Project Completion Report.

Note 1: ARPA: Automatic Radar Plotting Aids

Note 2: GMDSS: Global Maritime Distress and Safety System

### (3) Civil Works

The project constructed new school buildings for teaching of classes using training equipment as well as renovated facilities for the installation of training equipment. Table 8 shows the planned and actual project outputs for civil works. Regarding the construction of new school buildings, the actual number of buildings constructed was four against the planned one building. The reasons for this modification were that there was the necessity to construct additional three new buildings in the three METIs of PIP Semarang, PIP Makassar and BP2IP Barombong as a result of modifications in the types of training equipment introduced and layout changes where equipment was to be installed. Because of the above modifications, the number of schools that conducted school facility renovation changed from five to four schools. Since the above modifications were made in response to the modification of project outputs for the procurement of equipment, the modification of project outputs for civil works was justifiable.

Table 8: Planned and Actual Project Outputs (Civil Works)

Item	Plan	Actual
Construction of new buildings	Total: 1 building (Location) BP3IP	Total: 4 building (Location) BP3IP, PIP Semarang, PIP Makassar, BP2IP Barombong
Renovation Works of School Facilities for the installation of training equipment	Total: 5 schools (Location) STIP Jakarta, PIP Semarang, PIP Makassar, PIP Surabaya, BP2IP Barombong.	Total: 4 schools (Location) BP3IP, STIP Jakarta, PIP Semarang, PIP Makassar

Source: Response to the questionnaire.

Training Equipment introduced by the Project (Examples)



Radar/ARPA Simulator  
(PIP Surabaya)



Full Mission Engine Room  
Simulator (PIP Makassar)



GMDSS Simulator (Real Type)  
(PIP Semarang)



Diesel Engine Plant Simulator  
(BP3IP)



Full Mission Cargo Oil Handling  
Simulator (BP3IP)



Computer-based GMDSS Simulator  
(PIP Semarang)



Computer-based Cargo Handling  
Simulator (PIP Makassar)



Tank Cleaning Machine Trainer  
(BP2IP Barombong)



Solid Flootation Oil Booms  
(BP2IP Barombong)



Rescue Boat  
(PIP Semarang)



Language Laboratory  
(STIP Jakarta)



Chemistry Laboratory Equipment  
(STIP Jakarta)

### School Buildings Newly Constructed by the Project



BP3IP



PIP Makassar



PIP Semarang



BP2IP Barombong

### 3.4.2 Project Inputs

#### 3.4.2.1 Project Cost

The actual project cost was 6,410 million yen against 9,024 million yen planned cost, which was 89% of the planned cost (Table 9). Because there were modifications of the project outputs for civil works and the procurement of equipment, for reference, the ex-post evaluation conducted a trial calculation of the planned project cost based on the actual project outputs<sup>30</sup> and made a comparison between the estimated planned project cost modified by the trial calculation and the actual project cost. Based on the above, the estimated planned cost was 9,692 million yen, which was 66% of the planned cost.

The cost items exceeding the plan were the cost for education and training program (23 million yen overrun), the cost for civil works (848 million yen overrun), and the cost for consulting services (17 million yen overrun). The cost overrun of civil works was due to the expansion of the number of school buildings newly constructed from one to four. The cost for procurement of equipment was 2,547 million yen less than the plan (reduction of 38% against the plan) as a result of competitive bidding that enabled to sign the contract for the equipment-procurement package at a less price than the planned price, despite there being scope changes in the amount of procured equipment including additional equipment. Consequently, the cost overrun was compensated by cost savings in the procurement of equipment and the total project cost was within the planned cost.

<sup>30</sup> In this trial calculation, the planned costs for the procurement of equipment and civil works were recalculated based on actual project outputs by utilizing the same unit costs for equipment and civil works estimated at the time of appraisal of this project.

Table 9: Planned and Actual Project Cost

Item	Plan			Actual		
	Foreign Currency (mill. Yen)	Local Currency (mill. Yen)	Total (mill. Yen)	Foreign Currency (mill. Yen)	Local Currency (mill. Yen)	Total (mill. Yen)
Education and Training Program	383	15	398	256	165	421
Equipment and Civil Works	6,359	725	7,084	4,035	1,350	5,385
a) Procurement of Equipment	N.A.	N.A.	6,694	N.A.	N.A.	4,147
b) Civil Works	N.A.	N.A.	390	N.A.	N.A.	1,238
Consulting Service	465	122	587	388	216	604
Contingency	337	60	397	0	0	0
Tax/Duties, and Administration Cost	0	558	558	0	0	0
Total	7,544	1,480	9,024	4,679	1,731	6,410

Source: JICA appraisal documents and Project Completion Report.

Note: Exchange rate used for planned cost: IDR 1 = JPY 0.013 (As of September 2000)

Exchange rate used for actual cost: IDR 1 = JPY 0.0131 (consulting service), IDR 1 = JPY 0.0133 (main contracts) (Average between 2001 and 2010)

#### 3.4.2.2 Project Period

The actual project period was 115 months from December 2001 (signing of the loan agreement) to June 2011 (project completion) against planned 85 months from December 2001 to December 2007. This was longer than planned, at 134% of planned project period (Table 10).

The reasons for the delay were that (i) internal procedures of the executing agency took a long time at each step of the selection of consultants from the preparation of bidding documents to the signing of contracts, which resulted in about 16 months' delay, (ii) delay was caused by the preparation of detailed design with modifications of project scope that reflected the opinions of the executing agency, and (iii) the procurement procedure took a long time since the project was obliged to retender the contract package of civil works due to a single bid for the first tender, which resulted in about a 17 month' delay. In order to cope with the above delay, the expiry date of the loan agreement was extended for two years from June 10, 2009 to June 10, 2011.

Table 10: Planned and Actual Project Period

Item	Plan	Actual
1. Signing of Loan Agreement IP-507	December 2001	December 2001
2. Selection of Consultants	January 2002 – June 2002 (6 months)	November 2002 – April 2004 (18 months)
3. Consulting Service	July 2002 – December 2007 (66 months)	April 2004 – April 2011 (85 months)
4. Site Survey and Basic Design	July 2002 – December 2002 (6 months)	April 2004 – November 2005 (20 months)
5. Tender (from P/Q to Contract)	January 2003 – October 2004 (22 months)	November 2005 – February 2008 (28 months)

Item	Plan	Actual
6. Construction, Manufacture, and Installation	December 2004 – September 2006 (22 months)	February 2008 – November 2010 (34 months)
7. Education and Training Program	April 2006 – December 2007 (21 months)	July 2010 – June 2011 (12 months)
8. Project Completion	December 2007	June 2011

Source: JICA appraisal documents and Project Completion Report.

### 3.4.3 Results of Calculations of Internal Rates of Returns (Reference only)

Since this project is an education sector project for improvement of training equipment and education and training programs of maritime education and training schools, a quantitative analysis of the Internal Rate of Return (IRR) was not conducted at the time of the appraisal of this project in 2001. Therefore, the ex-post evaluation does not exercise a recalculation of IRR.

Although the project cost was within the plan, the project period exceeded the plan. Therefore, efficiency of the project is fair.

## 3.5 Sustainability (Rating: ②)

### 3.5.1 Institutional Aspects of Operation and Maintenance

The six target METIs are in charge of operation and maintenance (O&M) of the project equipment and facilities. The Transport Human Resource Development Agency (THRDA) is responsible for supervision of the O&M of the project equipment and facilities which is conducted by each school, and the securement and allocation of O&M budgets to each school. THRDA consists of three departments: the Education Department, the Training Department, and the General Department, and 20 staff out of the total 50 staff of THRDA have been working on supervision and budgeting. Instructors and technicians in the six METIs are assigned to take charge of O&M for each piece of equipment. Usually, technicians employed by each school are contracted employees who have mostly graduated from science and technological Polytechnics (i.e. same level as high school graduates in Japan). However, schools such as BP3IP and STIP Jakarta recruited several technicians who hold bachelor degrees from science and technological universities. The numbers of technicians of each school vary according to the size of school and scope of education, but from 8 to 25 technicians are employed per school. Regarding the O&M of the project equipment and facilities, instructors and technicians are assigned for each piece of equipment and to each facility, and the demarcation of their works is clearly

Table 11: Allocation of O&M staff in charge of the Project Equipment

School	Number of staff (instructors and technicians) in charge of O&M of the project equipment
BP3IP	57
STIP Jakarta	39
PIP Semarang	58
PIP Surabaya	7
PIP Makassar	93
BP2IP Barombong	34

Source: Response to the questionnaire.

defined (Table 11). The organization chart of the executing agency is shown in Figure 1.

No problems were observed in the institutional aspects of O&M of this project.

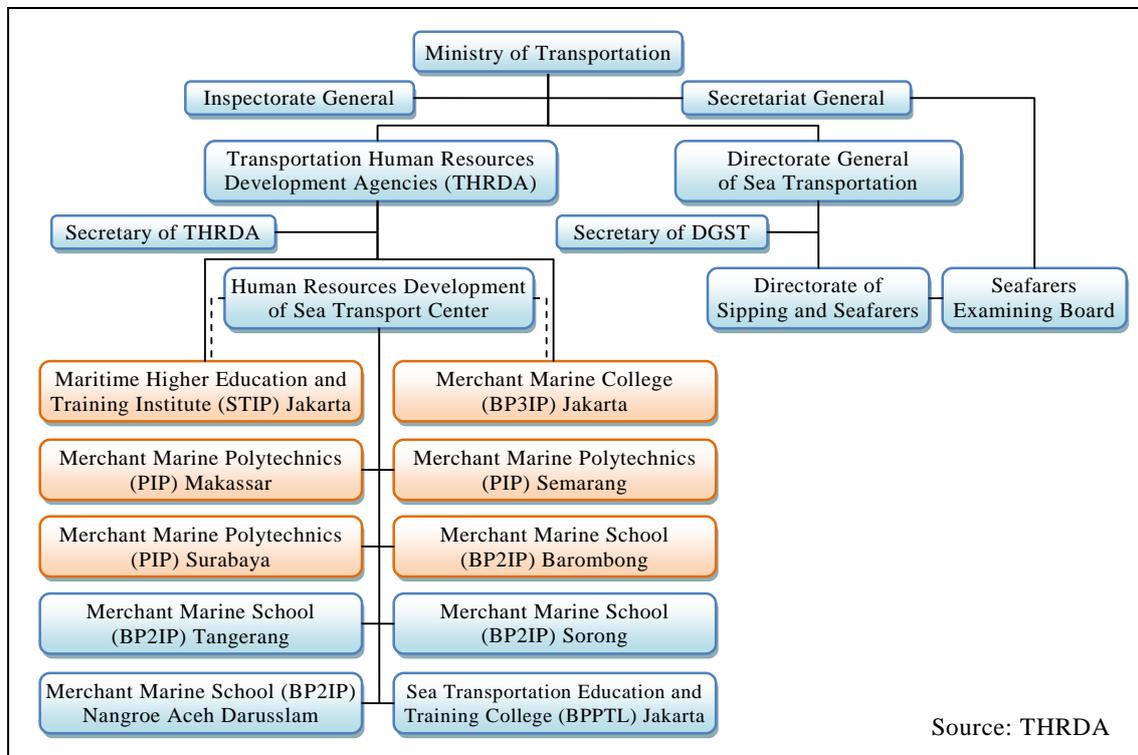


Figure 1: Organization Chart of Executing Agency

### 3.5.2 Technical Aspects of Operation and Maintenance

#### (1) Daily Maintenance by METIs and Maintenance Services of Contractors/ Manufacturers

In each school, technicians conduct the daily maintenance for each piece of training equipment and this includes: (i) starting up the system of each piece of equipment every day or every week, and checking problems, (ii) controlling the temperature of rooms where equipment is installed, and (iii) replacing batteries and making minor repairs to equipment according to the O&M plan.

The contract package of the project for equipment signed between THRADA and the contractors included a one year product warranty after the handing over of equipment and a three-year maintenance service package after the termination of the one year product warranty period. The contents of three-year maintenance service package were that a local service agent commissioned by the contractors visited each school once a year, undertook diagnostic evaluation on the condition of equipment, reported the causes of problems and recommended necessary countermeasures to each school. Based on the report and recommendations submitted by the local service agent, each school was expected to take the necessary actions and countermeasures for the repair of equipment as well as the replacement of spare parts. However,

due to differences in the technical and financial capacities of each school, the results of their responses were not same among the six METIs.

Meanwhile, the above three-year maintenance service package was terminated in April 2014. However, no concrete O&M plan was prepared, including the possibility of extension of the maintenance service package by the contractors, at the time of the ex-post evaluation.

## (2) Technical Knowledge of Instructors and Technicians

Since most of the project training equipment including simulators is of the full mission type (real type) and the advanced equipment is composed of specialized machines and a variety of application software, the repair and maintenance of the equipment require the knowledge of IT systems in addition to knowledge of electrical engineering. Although instructors in charge of O&M are familiar with how to operate the equipment, they have not necessarily acquired the relevant qualifications and technical knowledge for maintenance of the equipment as most of them have specialized in nautical and engineering subjects. Similarly, technicians have a certain level of knowledge of electrical engineering and the number of technicians who have specialized knowledge of IT systems was limited in the six METIs except for BP3IP and STPI Jakarta. The education and training program under this project provided a training course on “Reinforcement of Operation and Maintenance Capability for Ship Handling and Engine Room Simulators”. Aside from this, the manufacturers provided the O&M training for instructors through factory training in Japan, and technical guidance was given by engineers from the manufacturers during the installation of equipment at each school. However, the above training and technical guidance mainly focused on general O&M methods and basic trouble shooting using O&M manuals and they did not cover O&M methods and trouble shooting for IT systems and software of equipment that required special knowledge and skills. In this regard, the self-help efforts for updating special technical knowledge and skills on O&M by the six METIs continue to be necessary.

## (3) Training System and Utilization of O&M Manuals

Every year, THRDA conducts capacity development training on teaching skills (TOT 6.09 Certificates) and examination methods (TOE 3.12 Certificates) for instructors of the government METIs including the six METIs. BP3IP sent six instructors to the Netherlands to obtain certificates in simulator training (Certificate 6.10) through scholarships from the Dutch government. These six instructors have been conducting O&M training of simulators to other instructors and technicians in BP3IP and have tried to share their O&M knowledge and skills and improve the O&M capacities of



Operation and Maintenance Manuals in BP3IP

BP3IP institutionally. In addition, BP3IP has been practicing appropriate O&M activities in line with the procedures stipulated in the O&M manual such as the replacement of spare parts according to the given operation hours of equipment. Furthermore, BP3IP has been making efforts for trouble shooting by themselves referring to manuals and searching the information using internet. Therefore, all the project equipment in BP3IP has been operated without problems despite BP3IP receiving the largest amount of equipment among the six METIs. On the other hand, it has been observed that some METIs have not kept O&M manuals, backup CDs for application software of equipment, and passwords since these materials and information were not handed down from predecessor to successor. Such schools have some problems with equipment O&M.

In sum, the O&M capacity of each school varies. On the one hand, no major problems are observed in the technical capacity of BP3IP and STIP Jakarta. On the other hand, some problems are observed in the technical knowledge, training systems, and utilization of O&M manuals in the other four METIs.

### 3.5.3 Financial Aspects of Operation and Maintenance

The delay in transferring ownership of equipment from THRDA to each school affected the financial sustainability of this project negatively. Every year, each target school has been allocated an annual school budget including a budget for the O&M of school equipment and facilities. However, they are not allowed to execute the O&M budget for project equipment of which ownership has not been transferred to them because of regulations of the Indonesian government. Generally the financial resources of the target schools are: (i) government subsidies, and (ii) service revenues, which is an individual financial source for each school, earned from various school activities and businesses such as tuition fees and dormitory fees collected from students, and training fees paid by private companies and private schools when they receive training services from each school. In reality, however, each school is obliged to utilize a part of their service revenues to O&M of the project facilities and equipment because schools are not allowed to use government subsidies for the purpose of O&M of the project equipment. The scale of service revenues vary according to each school. For example, the proportion of service revenues among the total financial resources is 30-40% in the case of BP3IP and STIP Jakarta. However, that of PIP Surabaya is only 10% and total amount of service revenues is low. Due to the above differences, the schools whose service revenues are low have disadvantages in securing an O&M budget for the project facilities and equipment.

According to THRDA, the Ministry of Transport has already reserved the necessary O&M budget for the project facilities and equipment, and this will be executed by each school soon after the issue of transfer of ownership is formally settled. THRDA plans to complete the process of ownership transfer by the end of 2014.

Table 12 indicates the annual budget of the six target METIs in the last three years from

2011 to 2013. The actual O&M budgets for the project facilities and equipment only could not be identified due to lack of data<sup>31</sup>. According to interviews with the six METIs, it was recognized that the annual O&M budgets in the last three years, excluding the O&M budget for the project facilities and equipment, were mostly appropriate except in the case of PIP Semarang.

Table 12: Annual Budget of the Six Target METIs

(1) BP3IP

Unite: Million Rupiah

Budget Item	2011		2012		2013	
	Budget	Expenditure	Budget	Expenditure	Budget	Expenditure
1. Capital Expenditure	23,537	22,630	42,388	39,786	18,439	16,838
2. Operational Expenditure	58,969	40,823	68,488	52,793	73,934	60,680
3. Operation and Maintenance	N.A.	N.A.	813	N.A.	1,356	N.A.
Total	82,506	63,453	111,689	92,579	93,729	77,518

(2) STIP Jakarta

Budget Item	2011		2012		2013	
	Budget	Expenditure	Budget	Expenditure	Budget	Expenditure
1. Capital Expenditure	62,438	60,341	59,873	59,170	64,812	63,980
2. Operational Expenditure	95,589	81,017	106,722	90,696	129,908	104,196
3. Operation and Maintenance	553	431	404	340	201	195
Total	158,580	141,789	166,999	150,206	194,921	168,371

(3) PIP Semarang

Budget Item	2011		2012		2013	
	Budget	Expenditure	Budget	Expenditure	Budget	Expenditure
1. Capital Expenditure	10,710	9,324	45,948	43,900	6,057	4,901
2. Operational Expenditure	82,513	60,646	80,412	72,432	90,579	68,638
3. Operation and Maintenance	600	600	600	570	900	780
Total	93,823	70,570	126,960	116,902	97,536	74,319

(4) PIP Surabaya

Budget Item	2011		2012		2013	
	Budget	Expenditure	Budget	Expenditure	Budget	Expenditure
1. Capital Expenditure	106,508	104,962	20,242	13,627	12,941	10,007
2. Operational Expenditure	55,237	51,081	76,301	55,840	89,419	65,595
3. Operation and Maintenance	3,000	1,627	0	0	518	50
Total	164,745	157,670	96,543	69,467	102,878	75,652

<sup>31</sup> Since the target schools are not allowed to execute the budget for O&M of the project equipment because of regulations until the transfer of ownership is formally completed. Therefore, each school unofficially takes the O&M costs for the project equipment under the name of O&M costs for other equipment. For this reason, no official records and documents for the exact expenditures for O&M of the project equipment were produced.

## (5) PIP Makassar

Budget Item	2011		2012		2013	
	Budget	Expenditure	Budget	Expenditure	Budget	Expenditure
1. Capital Expenditure	147,509	119,691	35,605	34,075	93,008	86,046
2. Operational Expenditure	70,448	50,139	68,319	51,141	84,374	64,364
3. Operation and Maintenance	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Total	217,957	169,830	103,924	85,216	177,382	150,410

## (6) BP2IP Barombong

Budget Item	2011		2012		2013	
	Budget	Expenditure	Budget	Expenditure	Budget	Expenditure
1. Capital Expenditure	68,670	67,421	12,008	11,456	10,717	10,169
2. Operational Expenditure	29,144	21,540	39,730	28,915	46,793	36,685
3. Operation and Maintenance	N.A.	N.A.	N.A.	N.A.	300	N.A.
Total	97,814	88,961	51,738	40,371	57,810	46,854

Source: Response to the questionnaire.

Note 1: The expenditure of O&M in 2012 and 2013 of BP3IP included the operation expenditure of each year.

Note 2: The operation and maintenance cost for each METI includes operation and maintenance cost of all equipment and facilities of each METI.

### 3.5.4 Current Status of Operation and Maintenance

There were no problems observed in the current O&M status of the newly constructed school buildings and renovated facilities of the project. However, problems were identified in some equipment. Table 13 shows the summary of the O&M status of the project equipment, and Table 14 shows the list of training equipment confirmed as having problems at the time of ex-post evaluation. There were various reasons for malfunction of the equipment and the reasons for malfunction of some of the equipment could not be identified. The common reasons observed in each school were breakdown of UPS (Uninterruptible Power Supply System) and malfunction of software.

UPS is an appliance utilized for most of the simulators, but it needed to be replaced or repaired continuously because it frequently had trouble. It is considered that the unstable power supply with frequent voltage changes in Indonesia may relate to the above damage. Particularly, in South Sulawesi Province where PIP Makassar and BP2IP Barombong are located, the power supply is generally unstable and power failures occur very frequently. This may be one reason why UPS is damaged by excessive power loading. Regarding spare parts, each school has tried to procure spare parts in the local market as much as possible as it is costly to import genuine spare parts from Japanese manufacturers. However, those schools located in local regions face difficulties in accessing information and the markets for the procurement of spare parts in comparison with those schools in Jakarta such as BP3IP and STIP Jakarta where accessibility to information about spare parts and the availability of spare parts in the local market are better.

Regarding the issue of malfunction of software, it is difficult for the instructors and technicians of each school to solve the issue by themselves except for BP3IP and STIP Jakarta due to lack of specialized experts in IT systems. Non-updated software licenses and the lack of

periodical software updates may be other possible reasons for software problems. Effective countermeasures for the above issues have been under consideration in each school including the option of outsourcing of repair of training equipment with problems to private maintenance service providers.

Table 13: Summary of O&M Status of the Project Equipment

Type of Equipment	BP3IP	STIP Jakarta	PIP Semarang	PIP Surabaya	PIP Makassar	BP2IP Barombong
Radar/ARPA Simulator	○			●		●
Ship Maneuvering Simulator			●		●	
Engine Room Simulator	○		●		○	
Diesel Engine Plant Simulator	○					
GMDSS Simulator (incl. PC base)	○	●	●	○		●
Navigation Aids Simulator	○					
Engine Workshop Equipment	○					
PC based Cargo Handling Simulator					○	●
Cargo Oil Handling Simulator	○		○		●	
LNG Cargo Handling Simulator	○					
Inner Gas System			●	○		○
Automatic/Control Equipment	○					
Basic Safety Equipment	○	○	○	○	○	○
Tanker Cleaning Machine Trainer		○	●	○	○	○
Solid Floatation Oil Booms						○
Oil Recovery Devices						○
Physics and Chemistry Laboratory Equipment	○	○	○		○	
Language Laboratory	○	○			●	○

Source: Project Completion Report.

Note: ○: No problems or minor problems in O&M of equipment

●: Problems in O&M of equipment.

Table 14: Training Equipment confirmed with Problems at the Time of Ex-Post Evaluation

School	Equipment	Operation and Maintenance Status
STIP Jakarta	Computer-based GMDSS Simulator	One of VGA (Video Graphic Array) and UPS (Uninterruptible Power Supply System) are broken down. The necessary solutions have been under consideration.
PIP Semarang	Ship Maneuvering Simulator	Since June 2013, the monitor for the instructor has been out of use. The necessary solutions have been under consideration.
	Engine Room Simulator Inner Gas System	Since August 2013, the control PC for the instructor has been out of use. The necessary solutions have been under consideration.
	GMDSS Simulator	There are frequent defects of the monitor for the instructor. The necessary solutions have been under consideration.
	Tanker Cleaning Machine Trainer	Software problems. The necessary solutions have been under consideration.

School	Equipment	Operation and Maintenance Status
PIP Surabaya	Radar/ARPA Simulator	Since November 2013, one unit out of three units has been out of use due to software problems. The necessary solutions have been under consideration.
	GMDSS Simulator	Since 3013, software problems have occurred in the equipment for the instructor. The necessary solutions have been under consideration.
PIP Makassar	Ship Maneuvering Simulator	Some problems. The necessary solutions have been under consideration.
	Language Laboratory	Since 2010, the equipment has been out of use due to software problems.
	Cargo Oil Handling Simulator	Since 2012, the program has not been operated properly due to software problems. The necessary solutions have been under consideration.
BP2IP Barombong	Radar/ARPA Simulator	Operation has been suspended due to software problems. The necessary solutions have been under consideration.
	GMDSS Simulator	Since 2011, the simulator has been out of use due to software problems. The necessary solutions have been under consideration.
	Computer-based Cargo Handling Simulator	The operation of the ship maneuvering program has been suspended due to the breakdown of UPS and software problems. The necessary solutions have been under consideration.

Source: Response to the questionnaire and the results of project site visits by the external evaluator.

Some minor problems have been observed in the technical and financial aspects, and problems have been observed in the current status of the operation and maintenance of a part of the project equipment. Therefore the sustainability of the project effects is fair.

## 4. Conclusion, Recommendations and Lessons and Learned

### 4.1 Conclusion

The objective of this project was to improve the capacity of Indonesian seafarers to meet the requirements of STCW95 in their qualifications by the construction and installation of necessary facilities and equipment for training and education based on STCW95, together with capacity development of trainers in six government Maritime Education and Training Institutions (METIs). This project has been highly relevant to Indonesia's development plan and development needs, as well as to Japan's ODA policy. Therefore its relevance is high. Both the number of fulltime students on STCW95 compliant training to obtain certificates of competency and the number of graduates who passed the STCW95 compliant national examination fully achieved their respective targets. It was confirmed that the project contributed to improvements in the educational levels of the six METIs to some extent through the realization of the provision of seafarers' education and training in compliance with STCW95. However, the annual operation hours of major simulators of the project have not yet met the target as the operation of some simulators has been suspended due to breakdown and malfunction. Each school has made efforts to fulfill the required hours for practical training based on the annual training curriculum by utilizing a combination of the project equipment and similar types of

other equipment introduced with the assistance of other donors. It was confirmed that the project had positive impacts to some extent on securing employment opportunities for Indonesian seafarers, improving the safety of marine transport, and promoting opportunities for foreign currency earning. Therefore, the effectiveness and impact of the project are fair. Although the project cost was within the plan, the project period exceeded the plan. Therefore, the efficiency of the project is fair. Problems were observed in the current status of operation and maintenance of a part of the project equipment, and there have been constraints in the O&M budget for operation, maintenance and management because of the delay in ownership transfer of the project equipment from the executing agency to the six target METIs. Therefore the sustainability of the project effects is fair.

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

## 4.2 Recommendations

### 4.2.1 Recommendations to the Executing Agency

#### (1) Issue of Ownership Transfer of the Project Equipment

- Due to the delay of ownership transfer of the project equipment from THRDA to the six target METIs, each school found it difficult to execute the O&M budget for the project equipment allocated from THRDA. It is recommended that THRDA should accelerate the process of ownership transfer and enable the target schools to execute the O&M budget for project equipment as soon as possible.

#### (2) Operating and Maintenance

- BP3IP is the most capable school among the six METIs in terms of operation and maintenance. The reasons for this are: (i) they are more blessed with human resources (Instructors and technicians) in terms of their number and their capacity, (ii) they exercise proper operation and maintenance according to the procedures stipulated in the O&M manuals, (iii) there are many opportunities for information sharing and mutual learning among the instructors and technicians in charge of O&M, and (iv) they have a relatively large amount of available funds for O&M. This will be a good practice for the improvement of the O&M capacity of other schools. It is, therefore, expected that the experience and know-how of BP3IP be shared among the six METIs so that they can actively learn from each other.
- The three-year maintenance service package by the local agents of manufacturers after the warranty period terminated in April 2014. However, as yet no new mid-term or long-term maintenance plan for the project equipment has been established. Therefore, it is recommended that THRDA, as well as the six METIs, should examine the next maintenance plan including the option for partial

outsourcing of repair of training equipment to private maintenance service providers as soon as possible.

- In order to secure a stable O&M budget in the future, it is recommended that the six METIs should examine the possibility of using the service revenues of each school as an alternative financial source to supplement any shortages in the O&M budget in addition to the O&M budget allocated from THRDA to each school. In order to secure stable service revenues, it is expected that each school will promote the provision of training services to seafarers of shipping companies, the dispatch of instructors to private schools and the lending of training equipment.

(3) Issue of Data Collection and Management for Recording of the Employment Status of Graduates

- It is important to monitor the employment status of graduates in the six METIs since this is useful in evaluating and improving the educational capacity and educational level of each school. For this reason, it is recommended that the six METIs should at least collect and manage the data and information on the employment status of students at the time of graduation.

4.2.2 Recommendation to JICA

None.

4.3 Lessons Learned

(1) Issue of Transfer of Ownership of the Project Facility and Equipment where the Executing Agency and the O&M Agency are Different

- Due to the delay in ownership transfer from THRDA, the exacting agency, to the six target METIs, the O&M agencies, each school faced difficulties in executing the O&M budget for the project equipment and facilities because it was restricted by the rules and procedures of Indonesian government. Therefore, for similar projects in the future, it is required that JICA should examine the necessary legal and institutional procedures associated with the ownership transfer of project facilities at the time of project appraisal in cases where the executing agency and the O&M agency are separate organizations. Also, JICA should help the executing agency and the O&M agency to complete the necessary procedures after project completion as soon as possible.

End

### Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1. Project Outputs (1) Education and Training Program	<ul style="list-style-type: none"> <li>• Improvement of Seafarers' Education and Training Curricula</li> <li>• Overseas Training: 176 persons</li> </ul>	Same as planned
(2) Procurement of Education and Training Equipment	<ul style="list-style-type: none"> <li>• Radar/ARPA simulator: 3 sets</li> <li>• Ship maneuvering simulator: 2 sets</li> <li>• Engine room simulator: 2 sets</li> <li>• Diesel engine plant simulator: 2 sets</li> <li>• GMDSS simulator: 4 sets</li> <li>• Navigation aids simulator: 1 set</li> <li>• Engine workshop equipment: 1 set</li> <li>• Cargo handling simulator: 6 set</li> <li>• Inner gas system: 6 sets</li> <li>• Automatic/control equipment: 1 set</li> <li>• Basic safety equipment: 6 sets</li> <li>• Tanker cleaning machine trainer: 6 sets</li> <li>• Physical and chemistry laboratory equipment: 4 sets</li> <li>• Language laboratory: 4 sets</li> </ul>	<ul style="list-style-type: none"> <li>• Radar/ARPA simulator: 3 sets</li> <li>• Ship maneuvering simulator: 3 sets</li> <li>• Engine room simulator: 3 sets</li> <li>• Diesel engine plant simulator: 1 set</li> <li>• GMDSS simulator: 5 sets</li> <li>• Navigation aids simulator: 1 set</li> <li>• Engine workshop equipment: 1 set</li> <li>• Cargo handling simulator: 2 sets</li> <li>• Inner gas system: 3 sets</li> <li>• Automatic/control equipment: 1 set</li> <li>• Basic safety equipment: 6 sets</li> <li>• Tanker cleaning machine trainer: 5 sets</li> <li>• Physical and chemistry laboratory equipment: 4 sets</li> <li>• Language laboratory: 4 sets</li> </ul> <p>&lt;Additional outputs&gt;</p> <ul style="list-style-type: none"> <li>• Cargo oil handling simulator: 3 sets</li> <li>• LNG tanker simulator: 1 set</li> <li>• Solid floatation oil booms: 1 set</li> <li>• Oil recovery devices: 1 set</li> </ul>
(3) Civil Works	<ul style="list-style-type: none"> <li>• Construction of new building: 1</li> <li>• Renovation of facilities: 5</li> </ul>	Construction of new building: 4 Renovation of facilities: 4
(4) Consulting Services	<ul style="list-style-type: none"> <li>• Assistance of detailed design and tender</li> <li>• Monitoring of civil works for construction and installation of equipment</li> <li>• Logistic support for the education and training program</li> </ul>	Same as planned
2. Project Period	December 2001 – December 2007 (85 months)	December 2001 – June 2011 (115 months)
3. Project Cost		
Amount paid in Foreign currency	7,544 million yen	4,679 million yen
Amount paid in Local currency	1,480 million yen (113,860 million rupiah)	1,731 million yen (130,398 million rupiah)
Total	9,024 million yen	6,410 million yen
Japanese ODA loan portion	7,669 million yen	5,705 million yen
Exchange rate	1 rupiah = 0.013 yen (As of September 2000)	1 rupiah = 0.0131 yen (Consulting service) 1 rupiah = 0.0133 yen (Main contract) (Average between 2001 and 2010)