

Cambodia

## **Sihanoukville Port Urgent Rehabilitation Project Sihanoukville Port Urgent Expansion Project**

External Evaluator: Kenichi Inazawa, Octavia Japan Co., Ltd.

### **0. Summary**

At the time of the ex-post evaluation, it is confirmed that this project is relevant with the policy of Cambodia such as the transportation infrastructure development plan. It is also confirmed that the project is relevant with the development needs of the country such as port improvement and expansion. The project increased the container cargo handling volume increased at Sihanoukville Port. The project generally met its targets on the number of vessels entering the port, the gross tonnage, the berth occupancy rate, and the crane operating rate. Both the efficiency and the safety of the operation of the cargo handling machinery have improved. Furthermore, the project is responding to the increasing demand for cargo transportation, thereby contributing to the vitalization of the hinterland economy. While the project period slightly exceeded the initial plan, the project cost was within the plan. No major problems have been observed in the structural, technical and financial aspects of the operation and maintenance by the Executing Agency. In light of above, this project is evaluated to be highly satisfactory.

### **1. Project Description**



Project Location



Vessels Entering Sihanoukville Port

#### **1.1 Project Outline**

In Cambodia, peace was achieved in 1991, with the ending of the civil war. The country's only deep-water port, Sihanoukville Port, was built in 1960-70s. As the facilities became old, the cargo handling capacity of the port deteriorated. Cargo handling operation of the port was undermined with its weight limits. On the other hand, the cargo handling volume still increased

as the economic reconstruction progressed in the country. The port handled 130,000 tons in 1991, 560,000 tons in 1994, 880,000 tons in 1998, and 1,670,000 tons in 2002. While the containerization was becoming common, Sihanoukville Port was not equipped with any container berth. Container cargos were handled at the old pier, which was built for general freights, and consequently its cargo handling operation was inefficient. Therefore, there was a pressing need to construct a container terminal, improve the berth, carry out dredging work and install cargo handling machinery, thereby enabling Sihanoukville Port to respond to the increasing demand for the container transportation.

## 1.2 Project Outline

The purpose of the project is to improve the cargo handling capacity and the transport efficiency, by constructing a new container terminal, improving the container cargo berth and yard, and installing large cargo handling machinery at Sihanoukville Port; thereby contributing to the economic development in Cambodia.

Approved Loan Amount / Disbursed Loan Amount	(Urgent Rehabilitation Project) 4,142 million yen / 3,917 million yen
	(Urgent Expansion Project) 4,313 million yen / 3,921 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	(Urgent Rehabilitation Project) September 1999 / September 1999
	(Urgent Expansion Project) September 2004 / November 2004
Terms and Conditions: Interest Rate, Repayment Period, Conditions for Procurement, etc	(Urgent Rehabilitation Project) Interest Rate: 1.0% Repayment Period: 30 years Grace Period: 10 years The Consulting Services portion is subject to: Interest Rate of 0.75%; Repayment Period of 40 years; and Grace Period of 10 years. Condition for Procurement: General Untied
	(Urgent Expansion Project) Interest Rate: 0.9% Repayment Period: 30 years Grace Period: 10 year Condition for Procurement: General Untied
Borrower / Executing Agency	The Royal Government of Cambodia/ Port Authority of Sihanoukville (PAS)
Final Disbursement Date	Urgent Rehabilitation Project: January 2007
	Urgent Expansion Project: February 2011

Main Contractor (Over 1 billion yen)	Penta Ocean (Japan) and Italian Thai Development Public Company Limited (Thailand) (JV)
Main Consultant (Over 100 million yen)	Pacific Consultants International (Oriental Consultants Co., LTD.) (Japan)
Feasibility Studies, etc.	F/S <sup>1</sup> by JICA in 1997
Related Projects (if any)	<p>“Sihanoukville Port SEZ Development Project” (3,651million yen, JICA loan approved in March 2008)</p> <p>“Sihanoukville Port Multipurpose Terminal Development Project” (7,176million yen, JICA loan approved in August 2009)</p> <p>“The Project for the Study on Strengthening Competitiveness and Development of Sihanoukville Port” (Technical Cooperation Project of JICA, under implementation since June 2011)</p>

## 2. Outline of the Evaluation Study

### 2.1 External Evaluator

Kenichi Inazawa, Evaluation Consultant, Octavia Japan Co., Ltd.

### 2.2 Duration of Evaluation Study

Duration of the Study: August, 2011 - June, 2012

Duration of the Field Study: November 28 - December 12, 2011 (1st study)

March 5 – 11, 2012 (2nd study)

## 3. Results of the Evaluation (Overall Rating: A<sup>2</sup>)

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

#### 3.1.1 Relevance with the Development Plan of Cambodia

In 1990s, Cambodia was rebuilding the infrastructures that had been damaged during the civil war, such as roads, ports, and airports, with support of the international community. Aiming to become a traffic hub of the Greater Mekong Sub-region in the medium and long term,

<sup>1</sup> This F/S recommended: 1) construction of 400m berth for general cargos; 2) construction of 400m berth for containers; and 3) installation of large cargo handling machinery. The Urgent Rehabilitation Project covered 240m of the “2)”, whereas the Urgent Expansion Project covered the remaining 160m of the “2)” and “3).” (The construction of the 400m berth for general cargos is ongoing under the “Sihanoukville Port Multipurpose Terminal Development Project” listed as one of the “Related Projects” in the same table.)

<sup>2</sup> A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

<sup>3</sup> ③: High, ②: Fair, ①: Low

Cambodia was promoting the development of trans-frontier road network and other key infrastructures. The improvement of Sihanoukville Port, a gateway for international trades, was also given priority. In addition, the “Transport Sector Strategy Study” was prepared by the government of Cambodia in 2002, and it laid out policy proposals on the future transportation sector.

At the time of the ex-post evaluation, the government of Cambodia has continued to place emphasis on the development of basic infrastructures and transportation network such as ports and roads as stipulated in the National Strategic Development Plan (NSDP) 2009-2013. In relation to the port sector, the government has advocated for the “Open Sea Policy,” which promotes free port entrance, trade and port management. Under such circumstances, Sihanoukville Port, the international trading port handling approximately 70%-80% of the country’s cargo imports and exports, continues to be viewed as one of the key infrastructures for the national economy.

### 3.1.2 Relevance with the Development Needs of Cambodia

Before the project commencement, the piers built in 1960-70s were old at Sihanoukville Port. Weight limits had to be imposed on the cargos, and it undermined the cargo handling operation. Therefore, it was considered necessary to construct a new berth which replaces and expands the functions of the old piers. In addition, the expansion of the channel dredging was considered necessary because the loading capacities of the vessels entering the port kept increasing annually. There was also a need to install large cargo handling machinery in order to respond to the increasing demands for container cargos.

This project has enabled the port to respond to the increasing cargo demands by upgrading the berth and installing cargo handling machinery. In addition, another JICA loan project, the “Sihanoukville Port Multipurpose Terminal Development Project,” is ongoing and the old general cargo terminal is being improved in response to: 1) the growing bulk and general cargo handling in recent years; and 2) a need to strengthen the supply base of the materials and equipment for the mining of oil and natural gas that is being developed around the port. Furthermore, the “Sihanoukville Port Special Economic Zone Development Plan” is ongoing<sup>4</sup> with the expectation that recent economic growth will attract foreign investments and enterprises. Based on the above, it is judged that the port continues to have great needs for development.

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<sup>4</sup> The completion of this project is expected to bring businesses that import raw materials and re-export processed products into the SEZ. It is also expected to increase the cargo handling volume at the port.

### 3.1.3 Relevance with Japan's ODA Policy

The Japan's ODA Charter endorsed by the Cabinet in 1992 set a number of principles, one of which was to “urge attention to recipient accomplishments in democratizing, establishing market-oriented economic systems, and assuring basic human rights and freedoms.” In addition, the Charter listed infrastructure building as a basic condition essential for socioeconomic development. This project provided assistance in the area of infrastructure building for Cambodia which had been reconstructing its economy and promoting reforms of the economic structure since the peace agreement in 1991. This project was thus in line with the principle of the ODA Charter. On the other hand, Japan's Assistance Policy for Cambodia developed in 2002 stated that the economic growth of Cambodia would contribute to the long-term economic vitalization of ASEAN and would eventually benefit Japanese economy. The policy also advocated for the advancement of the economic social capital and infrastructure as a means to achieve sustainable economic growth and stable society. This project was considered as contributing to the advancement of the economic industry of Cambodia, playing a role in advancing Cambodia's function as a transportation hub for the ASEAN economy. The project was thus in line with the principle. Therefore, the Project is relevant with the Japan's aid policy.

Based on the above, this project has been highly relevant with the development plan and needs of Cambodia as well as with the ODA policy of Japan. Therefore, its relevance is high.

## 3.2 Effectiveness<sup>5</sup> (Rating: ③)

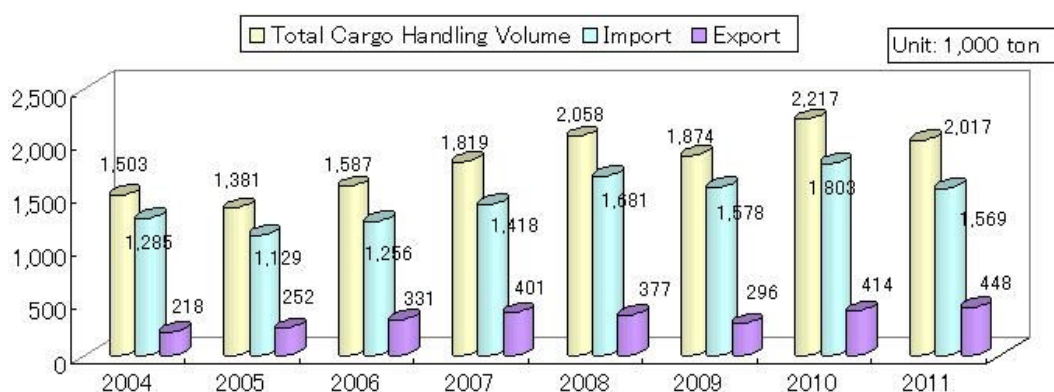
### 3.2.1 Quantitative Effects (Operation and Effect Indicators)

#### 1) Cargo Handling Volume

Figure 1 shows the trend in the total cargo handling volume at Sihanoukville Port.

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<sup>5</sup> Sub-rating for Effectiveness is to be put with consideration of Impact.



Source: Answers on questionnaires.

Figure 1: Trends in the Total Cargo Handling Volume (in thousand tons)

At the time of the appraisal of the “Urgent Rehabilitation Project” in 1999, the total cargo handling capacity was estimated to be around 1,400 thousand tons upon completion in 2004. As shown in Figure 1, the actual volume was approximately 1,500 thousand tons. As for the container handling capacity, it was estimated to be around 1,140 thousand tons or 114,000-162,000 TEU<sup>6</sup> in 2004, whereas the actual handling volume was 214,000 TEU as shown in Figure 2. It is because the economic growth rate had been on the increase<sup>7</sup>, which activated the exports and imports and increased the cargo demands.

At the time of the appraisal of the “Urgent Expansion Project” in 2004, the container handling volume (TEU) was estimated to reach 286,767 TEU in 2010. As shown in Figure 2, the actual volume in 2010 was 223,000 TEU, followed by 238,000 TEU in 2011. The actual volumes of 2010 and 2011 were slightly less than estimated because: 1) the cargo handling volume of Sihanoukville Port declined following the global financial crisis in 2008-2009, as it was the case for other ports, and the recovery is taking time though it has almost returned to the pre-crisis level since 2010; and 2) the river port of Phnom Penh is increasing its cargo handling and transportation volume by taking advantage of the feeder route network with Cai Mep-Thi Vai International Port opened in the southern Vietnam in 2009, and it has started to affect the cargo handling at Sihanoukville Port<sup>8</sup>. Cambodia is famous for its export-driven light industries, such as garment manufacturing and shoemaking. With a view to reducing time and cost, some companies with factories around Phnom Penh are beginning to export their products to the U.S.

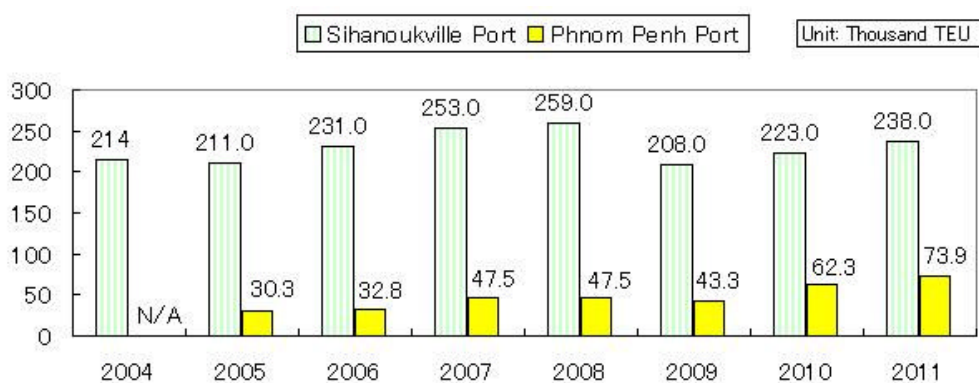
<sup>6</sup>According to the Project Completion Report, the Executing Agency estimated the average TEU level of 7-10 tons/TEU for the period of 2004-2015.

<sup>7</sup> Refer to the “trends in the Gross Domestic Product (GDP) of Cambodia” in the “Impact” section.

<sup>8</sup> Refer to Figure 3 for the positional relations among the ports. The route to transport with barges from Phnom Penh Port and transship at Cai Mep-Thi Vai Port (southern Vietnam) which has developed deepwater berth is becoming popular.

and other Asian countries using the combination of Phnom Penh Port and Cai Mep-Thi Vai Port of southern Vietnam. This is beginning to affect the cargo handling volume at Sihanoukville Port.

On the other hand, Sihanoukville Port's cargo handling volume is expected to continue growing along with the economic growth and industry expansion<sup>9</sup> on the ground that: 1) The ADB-financed "Sihanoukville - Phnom Penh Railway Development Project" will be completed shortly (the end of 2012 - mid 2013), and the railway container transportation to the Phnom Penh metropolitan area is expected to increase (= the railway transportation is not only faster but also cheaper by approximately 20% than road transportation in Cambodia, and the demand for the railway cargo transportation is expected to grow); and 2) the "Sihanoukville Port Special Economic Zone Development Plan" financed by JICA loan is almost completed as of the end of 2011. It is a promising factor that the port's cargo handling volume is likely to grow as the number of enterprises moving into the zone increases.



Source: Sihanoukville Port and Phnom Penh Port<sup>10</sup>

Figure 2: Comparison of the Container Handling Volume (Thousand TEU) at Sihanoukville Port and Phnom Penh Port

<sup>9</sup> The Executing Agency is estimating the port's container handling volume to be 300,000 TEU in 2017.

<sup>10</sup> No data was available for Phnom Penh Port in 2004, and the 2011 figure is an estimate.





Figure 3: Positional Relations of Sihanoukville Port and Other Ports  
(The picture at the upper right shows serviced routes: dotted lines indicate land routes, and shaded lines indicate waterways.)



Figure 4: Transitions of Sihanoukville Port  
Left: At the Time of the Opening of the Port in 1960, Center: Before the Project Implementation in 1996, Right: After the Project Completion in 2011

With regard to the exports/imports ratio of Sihanoukville Port, imports tend to exceed exports as shown in Figure 1. Taking the garment manufacturing industry as an example, many companies import raw materials from China and other countries, turn them into products at factories inside the country, and export them mainly in container loads. Domestic consumption is also strong; domestic demands for construction materials have increased along with the recent economic growth, and as a result, imports of steel, cement, oil, etc. have increased. As for



exports, general and bulk cargos are expected to increase in the future. The current direction of the government of Cambodia is to expand rice production and increase rice exports, and exports using this port are expected to grow<sup>11</sup>. Exports of papermaking wood chips are also expected to grow.

Based on the above factors, it is observed that Sihanoukville Port is driving the Cambodian economy as the international trading port, playing a key role in vitalizing the hinterland economy.

## 2) Number of Vessels Entering the Port, Gross Tonnage, Berth Occupancy Rate and Crane Operating Rate.

Table 1 shows the data on the number of vessels entering the port, the gross tonnage, the berth occupancy rate, and the crane operating rate at Sihanoukville Port. In 2010, the actual values exceeded the targets set at the time of the appraisal, therefore it can be judged that the port is effectively utilized and efficiently operated as a port and harbor facility.

Table 1: Number of Vessels Entering the Port, Gross Tonnage, Berth Occupancy Rate and Crane Operating Rate at Sihanoukville Port

At the Time of the Appraisal (in 2004)	Actual Values in 2010
1. Number of Vessels Entering the Port: *Unknown	1. Number of Vessels Entering the Port: 427
2. Gross Tonnage: 1,352,144 GT (Actual in 2002) 2,198,144 GT (Target for 2010)	2. Gross Tonnage: 2,217,150 GT
3. Berth Occupancy Rate <sup>12</sup> : 46% (Actual in 2002) 55% (Target for 2010)	3. Berth Occupancy Rate: 65%
4. Average Waiting Time <sup>13</sup> : 2 hours (Actual in 2002) 1 hour (Target for 2010)	4. Average Waiting Time: 0 hour
5. Containerization Rate <sup>14</sup> : 59% (Actual in 2002) 68% (Target for 2010)	5. Containerization Rate: 86.83%

### 1. and 2. Number of Vessels Entering the Port and Gross Tonnage:

<sup>11</sup> In 2010, 44,000 tons of rice were exported, and approximately 110,000 tons in 2011. Rice is bagged and transported in the container loads.

<sup>12</sup> Berth Occupancy Rate = Duration that berth was occupied (hours) ÷ Duration that berth was operated (hours). It is used to judge the level of effective utilization of berths.

<sup>13</sup> Average Waiting Time for Vessels Entering the Port = Demurrage Hours ÷ Number of Vessels Entering the Port. It is used to judge whether or not the congestion is eased.

<sup>14</sup> Containerization rate = The amount of container cargos in tons ÷ Cargos that can be containerized in tons. This is used to judge whether or not the cargo handling efficiency is improving.

The number of vessels entering the port was unknown at the time of the appraisal. On a gross tonnage basis, the actual value was more or less the same in 2010 as the target figure.

### 3. Berth Occupancy Rate:

In 2010, the actual rate exceeded the target set at the time of the appraisal. According to the Executing Agency, they signed contracts with the shipping companies about the port facility use, which allowed strict management of the hours of berth use and the schedules of the container vessels entering the port. As a result, the facility utilization became more effective, and the berth occupancy rate exceeded the target.

### 4. Average Waiting Time:

Currently, there is no waiting time for the vessels entering and exiting Sihanoukville Port. According to the Executing Agency, vessels do not need to wait offshore because the contracts with the shipping companies allow better management of the schedules of the entering vessels. It is also because the cargo handling is thoroughly managed 24 hours a day. Another positive factor is that there are many staffs with ample experience in cargo handling and operation, as it will be discussed in the “Technical Aspects of the Operation and Maintenance” of the “Sustainability” section.

### 5. Containerization Rate:

Similarly, the actual containerization rate in 2010 is higher than the target set at the time of the appraisal. According to the Executing Agency, it is because the loading capacity of the container vessels entering the port has been increasing annually.



Figure 5: Truck Transporting a Container



Figure 6: Procured Gantry Crane

### 3.2.2 Qualitative Effects

#### 1) Improved Safety in Cargo Handling and Port Operation

The incidences of accidents and container damages inside the facilities have decreased after the improvement of the old port facility. According to the Executing Agency, about 15 accidents

a year occurred on average before the project implementation, and now the number is down to about five a year. Most accidents have involved the mishandling of the cranes and minor injuries of the staff at the site. There has not been any serious case resulting in casualty during the project implementation. As for the damages on the container cargos during the loading and unloading, accidents occurred 10 times a year on average before the project implementation, and now the number is down to about three times a year. According to interviews with the top officials of the Executing Agency and the site staff, these improvements were possible thanks to: 1) the training course that was held on container operation during the project implementation; and 2) thorough instruction and supervision to ensure that the operational manual is strictly followed. With a goal of improving the operational safety, site staffs also participate in regular safety sessions twice a year.

#### 2) Streamlining the Loading and Unloading

As a result of the introduction of the Container Terminal Management System (CTMS) under the “Urgent Expansion Project,” the capacity to operate and manage the container berth has improved. Similarly, the capacity of the staffs in terminal operation has improved. According to the Executing Agency, they used to manage 10-12 boxes of loading/unloading per hour on average before the introduction of the CTMS. After the project implementation, the rate has improved greatly to 25-28 boxes per hour. It was commented that the training and advice given by the contractors at the time of the machinery installation were useful, resulting in the improvement of the operation and management capacity.

In light of the above, this project has largely achieved its objectives, therefore its effectiveness is high.

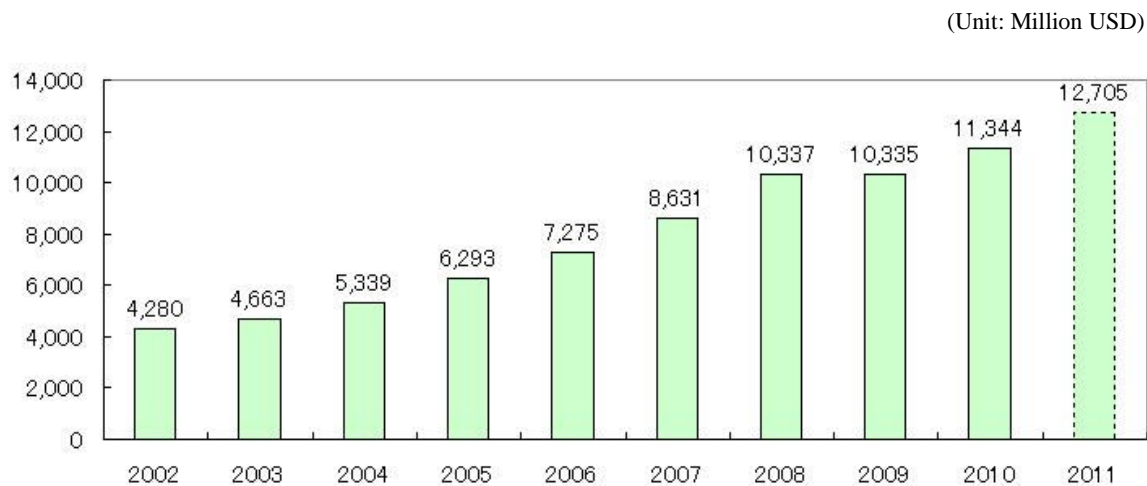
### 3.3 Impact

#### 3.3.1 Intended Impacts

##### 3.3.1.1 Economic Growth of Cambodia

Figure 7 shows the trend in the Gross Domestic Product (GDP) of Cambodia for the past 10 years. The growth rate has been high at 8% on average. Despite the slight decline in 2008-2009 influenced by the global financial crisis, the economy has been recovering since 2010. There are many factors other than this project contributing to the economic growth, and it is difficult to measure the exact economic impact of this project. Nevertheless, Sihanoukville Port is the only

deep-water port in the country, the international trading port handling 70%-80% of the country's total cargo, and one of the principal infrastructures driving the national economy. Therefore, it is judged that Sihanoukville Port is supporting the high economic growth.



Source: Ministry of Economy and Finance of Cambodia

Note) The 2011 figure is an estimate.

Figure 7: Trends in the Gross Domestic Product (GDP) of Cambodia

### 3.3.2 Other Impacts

#### 3.3.2.1 Impacts on the Natural Environment

##### 1) Impacts on Water Quality during the Dredging

Before the project implementation, it was concerned that the removed soil left in the offing during the project implementation might have negative impacts on the water quality. According to the interviews with the Executing Agency through this evaluation study, the dredged soil was disposed in the offing far from the port (around 7km away), and there was no particular negative impact on the water quality in the surrounding ocean. In fact, the Executing Agency conducted regular water examinations during the project implementation and reported to the Ministry of Environment. There were no recommended corrective measures urged by the Ministry, and there was no major problem.

Currently, the Harbor Master Department is responsible for the environment monitoring within the Executing Agency. This department develops the “environment management plan,” which measures solid and liquid waste and air pollutant emissions from the vessels entering the port, according to the standards. In case anything exceeds the standard level, it is reported to the Environmental Impact Assessment Department of the Ministry of Environment, and they

re-examine and advise on the corrective measures. There has not been any problem to date including the impacts on water quality.

The Environmental Impact Assessment (EIA) was approved in May 1999 for the “Urgent Rehabilitation Project” and in January 2003 for the “Urgent Expansion Project.”

## 2) Noise and Congestion Caused by the Construction Vehicles

During the project implementation, courses were given to the drivers of the construction vehicles on traffic rule adherence. According to the Executing Agency, they made efforts to prevent accidents and reduce noise by requesting that the contractors ensure that their drivers drove safely. Similarly, they requested that the drivers not pass through residential areas and school zones as much as possible.

On the other hand, there are currently many trailers and trucks in front of the gate of the container terminal towards the weekends (refer to Figure 8), because vessels typically enter the port on weekends, and many manufacturing factories transport their products to the port by trailers near the weekends. Congestion also occurs at customs. The Executing Agency and the local police are trying to ease the congestion by guiding trailers and directing traffic in front of the gate. However, they have not been able to come up with any radical solution. The congestion is expected to worsen as the container cargo handling of the port increases, and so it is an urgent issue that needs to be addressed.<sup>15</sup>



Figure 8: Congestion in Front of the Gate of the Container Terminal

### 3.3.2.2 Land Acquisition and Resettlement

No land acquisition and resettlement was needed. This was confirmed by the interviews with

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<sup>15</sup> A team of experts is currently exploring solutions to the problem of congestion under “the Project for the Study on Strengthening Competitiveness and Development of Sihanoukville Port,” which will be discussed in a box under the “Sustainability” section.

the Executing Agency and the site visits through this evaluation study.

### 3.3.2.3 Other impacts (Social Development Promotion and HIV/AIDS Prevention)

HIV/AIDS was a serious social issue in Cambodia around the time of the project appraisal. The HIV prevalence rate<sup>16</sup> for those aged between fifteen and forty-nine was high at 3.9% in 1997, 3.5% in 1998, and 2.8% in 1999<sup>17</sup> for a number of reasons including: (1) limited knowledge of people about HIV/AIDS; (2) difficulty in accessing HIV/AIDS related information; and (3) insufficient health and medical services. In such circumstances, the Project, as it dealt with construction of port facilities, required many construction workers, most of whom were migrant laborers from different parts of the country. As these workers needed to spend a certain period of time around the construction site where a number of prostitution houses existed, there was a considerable risk of HIV/AIDS infection among the workers. With a view to minimizing such negative social impact of the Project, i.e., HIV/AIDS prevalence worsening in the target area due to the Project, JICA implemented a HIV/AIDS program by supporting and cooperating with the Cambodian partners. The HIV/AIDS program and its effectiveness were reviewed and analyzed through this evaluation study, and the findings are summarized below.

#### 1. HIV/AIDS Intervention and Its Effectiveness Concerning the “Urgent Rehabilitation Project”

JICA conducted a study called “Special Assistance for Project Implementation (SAPI)”<sup>18</sup>, during the implementation of the “Urgent Rehabilitation Project”<sup>19</sup>. It piloted three approaches: (1) advocacy<sup>20</sup>; (2) peer education and life skill<sup>21</sup> for the port construction workers; and (3) social marketing of condoms<sup>22</sup>. As a result, the advocacy work, which included issuance of newsletters, became a driving force for promoting the project. As for

<sup>16</sup> The prevalence rate refers to a proportion of individuals who have a certain disease among the general population at a certain point of time.

<sup>17</sup> Source is year 2000 statistics by National Center for HIV/AIDS, Dermatology and STD (NCHADS).

<sup>18</sup> Although the implementer of the project is the recipient country, JICA plays an advisory role as needed to ensure smooth implementation of the project. JICA conducts SAPI in some cases as a way of providing additional and supplementary inputs.

<sup>19</sup> The total number of construction workers was approximately 9,800 for the “Urgent Rehabilitation Project.”

<sup>20</sup> This was necessary for the thorough implementation of the HIV/AIDS prevention activities. It was mainly about promoting HIV/AIDS prevention among different governmental organizations and creating mutual understanding among different stakeholders about the methods and structure used for the HIV intervention. The implementing partner was the Provincial AIDS Office of Sihanoukville.

<sup>21</sup> This aimed to equip construction workers with life skills and information about correct ways of preventing HIV/AIDS through peer education and training. The implementing partner was Cambodian Red Cross (CRC).

<sup>22</sup> It was considered important to promote condom use by selling/distributing good quality condoms at an affordable price as the Project was responsible for protecting its workers and their families from HIV/AIDS. Condoms were not distributed for free because it was feared that free distribution might reduce the chance of its use. Instead condoms were sold at an affordable price to encourage its use with a sense of responsibility. The implementing partner was “Population Service International (PSI)”, a local NGO.

peer education and life skill, approximately 85% of the construction workers participated in a series of workshops and improved their knowledge about HIV/AIDS and sexually-transmitted infection. Following the social marketing of condoms, the number of sales base in Sihanoukville City increased from 55 to 142, which facilitated the purchasing of condoms by the workers. It is judged that the piloted approaches and activities facilitated the improvement of knowledge about HIV/AIDS while contributing to minimizing the risk of infection by promoting condom use among the construction workers. Therefore, its effectiveness is judged to be high.

## 2. HIV/AIDS Intervention and Its Effectiveness Concerning the “Urgent Expansion Project”

As for the “Urgent Expansion Project,” interventions concerning HIV/AIDS and STI were implemented based on the results of the HIV/AIDS pilot project mentioned above. It began by including a clause about HIV/AIDS in the tendering document used for procurement of contractors. It reads: “The Contractor must provide HIV/AIDS clinical services as well as knowledge and education concerning HIV/AIDS for its staff and construction workers. As a part of the clinical service, the Contractor should distribute condoms.” As per the clause, the Contractor implemented the following activities for its construction workers: (1) workshops on HIV/AIDS through peer education; (2) promotion of condom use (including condom distribution); (3) STI<sup>23</sup> testing and treatment; and (4) health counseling. The workshops on HIV/AIDS covered a wide range of topics<sup>24</sup> and attracted as many as 8,769<sup>25</sup> construction workers in total. In addition, the number of condoms the workers received increased in response to the increasing number of workshops. This implies that the workers successfully improved their knowledge about HIV/AIDS, realizing how crucial HIV/AIDS prevention was in order to protect their health. The Executing Agency conducted a health examination (end-line survey) at which the workers were tested for HIV/AIDS, and it detected no case of infection among the workers. This implies that the project controlled infection among the construction workers throughout the project implementation, that is to say, the project did not cause any new infection. Therefore, it can be judged that this HIV/AIDS intervention was

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<sup>23</sup> It stands for Sexually Transmitted Infection.

<sup>24</sup> The workshops covered a wide range of topics from the basics, such as “What is HIV/AIDS?” to more specific cases of infections.

<sup>25</sup> As the “Urgent Expansion Project” required approximately 5,400 workers in total, each worker participated in workshops more than one time.

<sup>26</sup> The Executing Agency commented: “The workers greatly improved their knowledge about health, HIV/AIDS, and the necessity of condom use. They participated in a number of workshops during the construction period, exchanged and shared information with peers, and discussed what they learned with their families and friends after they returned to their hometowns. The intervention thus contributed to HIV/AIDS prevention.”



highly effective<sup>26</sup>.

In light of above, it can be concluded that the HIV/AIDS program by JICA was effective. It is now a common understanding of many international donors that HIV/AIDS consideration is necessary for large-scale infrastructure projects which require many migrant workers, particularly for centralized projects, such as port and airport construction, and for projects covering many intervals, such as road and railway construction. JICA was one of the pioneers who implemented HIV/AIDS intervention with a view to minimizing negative social impacts of infrastructure projects. It was an innovative and groundbreaking work, as it presented an exemplary assistance approach and implementation.



Figure 9: Clinic inside Sihanoukville Port<sup>27</sup>



Figure 10: Interview with a Sex Shop Owner around Sihanoukville Port

### 3.4 Efficiency (Rating: ②)

#### 3.4.1 Project Outputs

Table 2 compares the planned and actual outputs of the Project.

<sup>27</sup> It is a general clinic. Medical examinations and test were conducted for sexually transmitted diseases for the port construction workers during the project implementation.

Table 2: Planned and Actual Outputs of the Project

Plan (At the Time of the Appraisal)	Actual (At the Time of the Ex-Post Evaluation)
<p><b>【Urgent Rehabilitation Project】</b> (appraised in 1999)</p> <p>1. Civil Works</p> <ul style="list-style-type: none"> <li>• Construction of Container Berth: 240m</li> <li>• Construction of Container Yard (land reclamation): 60,000m<sup>2</sup></li> <li>• Dredging: 877,875m<sup>3</sup>(Depth:-8.5m/-9.0m)</li> </ul> <p>2. Consulting Services 166.5M/M (Foreign: 83.5M/M, Local: 83.0M/M, TOR: Supports related to the detail design, bidding documents development, bidding, supervision of civil works, technical training, and environmental monitoring.)</p>	<p><b>【Urgent Rehabilitation Project】</b></p> <p>1. Civil Works</p> <ul style="list-style-type: none"> <li>• Construction of Container Berth: As Planned</li> <li>• Construction of Container Yard (land reclamation): 67,135m<sup>2</sup></li> <li>• Dredging: 833,836m<sup>3</sup>(Depth:-9.0m/-10.0m)</li> </ul> <p>2. Consulting Services M/M: As Planned</p>
<p><b>【Urgent Expansion Project】</b> (appraised in 2004)</p> <p>1. Civil Works</p> <ul style="list-style-type: none"> <li>• Expansion of Container Berth: 160m</li> <li>• Dredging: 400,000m<sup>3</sup></li> </ul> <p>2. Procurement Procurement of Cargo Handling Equipment: Two Gantry Cranes, five Transfer Cranes, Container Terminal Operating Management System (CTMS)<sup>28</sup> and others.</p> <p>3. Consulting Services 247.0M/M (Foreign: 82.0M/M, Local: 165.0 M/M) It was expected that the above mentioned management consultants for the “Urgent Rehabilitation Project” would be contracted on the basis of a single tender. TOR: 1) Preparation of the management guideline; 2) Training on operation system; 3) On the job training; 4) Skill training for the cargo handling machine operators; and 5) Monitoring.</p>	<p><b>【Urgent Expansion Project】</b></p> <p>1. Civil Works</p> <ul style="list-style-type: none"> <li>• Expansion of Container Berth: As Planned</li> <li>• Dredging: 588,000m<sup>3</sup></li> </ul> <p>2. Procurement As Planned</p> <p>3. Consulting Services 210.0M/M (Foreign: 70.0M/M, Local: 140.0M/M) As planned, the management consultants from the “Urgent Rehabilitation Project” were contracted on the basis of a single tender. However, all the tasks except for “1) Preparation of the management guideline” were taken out from the TOR.</p> <p><b>【Additional Outputs】</b> Additional dredging work of 130,230m<sup>3</sup> was implemented in April-October 2006.</p>

<sup>28</sup> CTMS is a system to manage and operate the basic information in the container terminal.

The reasons for the discrepancies between the plan and actual values will be discussed below. It appears that all changes were made for reasons that are justifiable.

#### 【Urgent Rehabilitation Project】

##### 1. Civil Works

There is a discrepancy between the plan and actual container yard constructed because the area of the apron<sup>29</sup> (30m x 240m = 7,200m<sup>2</sup>) was unknown in the planning stage. The total area including that of the apron was calculated at the time of the detail design, based on which the construction was executed. For this reason, the actual container yard constructed was 67,135m<sup>2</sup>.

A small discrepancy is found between the plan and actual dredge volume because the volume was re-estimated in the detail design stage and adjusted downwards. The actual depth was -9.0 m/-10.0m<sup>30</sup> because there was a design change as a result of the F/S review.

#### 【Urgent Expansion Project】

##### 1. Civil Works

There is a discrepancy between the planned and actual dredge volume because a need arose to increase the dredge volume so that the basins could accommodate large-size vessels. In 2004-2008, the number of large-size vessels entering Sihanoukville Port was increasing, and it was necessary to take the safety aspects into consideration.

##### 2. Consulting Services

The actual M/M was less than planned because most tasks were taken out from the Consultants' TOR except for the "1) Preparation of the management guideline" found in the table above. According to the Executing Agency, TOR 2)-5) were removed because the Executing Agency considered that they had gained enough knowledge and experience from the "Urgent Rehabilitation Project" to carry out these tasks themselves without the support of the consultants, as long as they received some guidance and advice from the suppliers of the machinery.

#### 【Additional Outputs】

The additional dredging work of 130,230m<sup>3</sup> was implemented because of the same reason given on the dredge volume and the basins under the "Civil Works" above.<sup>31</sup>

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<sup>29</sup> The apron is an anterior boundary of a berth, a tip of the quay facing the ocean. In case of container berths, rails for gantry cranes are laid on the apron.

<sup>30</sup> It was -9.0m for the quay and port/harbor zone, and -10.0m for the waterway zone.

<sup>31</sup> The remaining budget from the "Urgent Rehabilitation Project" in the amount of approximately 78 million yen

### 3.4.2 Project Inputs

#### 3.4.2.1 Project Cost

For the “Urgent Rehabilitation Project,” the planned cost was 5,050 million yen (out of which 4,142 million yen by JICA loan), and the actual cost was 4,739 million yen (out of which 3,917 million yen by JICA loan), which was within the plan (94% of the plan). It is mainly because of the contingency budget which was not needed, while the remaining balance from the loan was allocated for the additional output mentioned above.

As for the “Urgent Expansion Project,” the planned cost was 5,489 million yen (out of which 4,313 million yen by JICA loan), and the actual cost was 4,919 million yen (out of which 3,921 million yen by JICA loan), which was within the plan (90% of the plan). It is because of the saving on the consulting services as explained in the “Project Outputs” section above.

#### 3.4.2.2 Project Period

The planned project period for the “Urgent Rehabilitation Project” was 4 years and 7 months or 55 months from September 1999 to March 2004. However, it actually took 7 years and 2 months or 86 months from September 1999 to October 2006, which is 156% longer than planned. The project completion was delayed because it was the first JICA loan for the Executing Agency and that it took long for the selection and recruitment of the consultants and the detail design. The delay was also caused by the internal procedures of the government of Cambodia such as the budget allocations for the local currency portion.

As for the “Urgent Expansion Project,” the planned project period was 4 years and 1 month or 49 months from November 2004 to November 2008. In reality, it took 5 years and 5 months or 65 months from November 2004 to March 2010, which is 133% longer than planned. The main reasons are: 1) the bid selection and contract signing for the cargo handling machinery were delayed; 2) the review of the machinery procurement plan required time; and 3) the installation of the Container Terminal Management System (CTMS) took longer than expected.

Based on the above, although the project cost was within the plan, the project period slightly exceeded the plan, therefore efficiency of the project is fair.

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was utilized for this additional construction.

### 3.4.3 Results of Calculations of Internal Rates of Return (IRR)

#### (1) Financial Internal Rate of Return (FIRR)

Recalculating the financial internal rate of return with the cargo handling income as the benefits, with the project construction cost and operation and maintenance expenses as the costs, and with assumed project life of 30 years, the result is 16.83%. The result is slightly higher than 14.90%, the estimate at the time of the appraisal, because the initial investment cost (construction cost) and operation and maintenance expenses were lower than initially estimated.

#### (2) Economic Internal Rate of Return (EIRR)

Recalculation the economic internal rate of return with the reduction in the vessels' waiting time and the reduction in the alternative transportation cost as the benefits, with the construction cost and operation and maintenance expenses as the costs, and with assumed project life of 30 years, the result is 17.20%, which is more or less the same as 17.80%, the rate estimated at the time of the appraisal. As discussed earlier, the container cargo handling volume was slightly less than expected while the actual project cost was less than planned, therefore the EIRR did not rise.

### 3.5 Sustainability (Rating: ③)

#### 3.5.1 Structural Aspects of Operation and Maintenance

The Executing Agency of this project is Port Authority of Sihanoukville (PAS). PAS is a financially independent public corporation supervised by the Ministry of Public Works and Transport as well as the Ministry of Economy and Finance. PAS is mandated to operate and manage Sihanoukville Port and Sihanoukville Economic Zone (SEZ). As for the organizational structure, there is one Port Head supported by three Deputy Heads. Under these positions, there are eight departments namely the Technical Material Department, the Machinery Department, the Phnom Penh Dry Port Department, the Container Yard Operation Department, the General Cargo Operation Department, the Business Department, the Admin-Personnel Department, and the Harbor Master Department. In addition, there are four departments directly under the Port Head, namely the Marketing and SEZ Department, the Internal Audit Department, the Statistic-Planning Department, and the Account-Finance Department. PAS has 1,065 staff in total.

The departments responsible for the operation and maintenance of this project are listed below with information on their areas of responsibility and the staffing level.

1) Container Yard Operation Department (269 staff):

Mainly responsible for the operation and maintenance of the container terminal, container yard and cargo handling machinery.

2) Harbor Master Department (85 staff):

Mainly responsible for the operation and maintenance of the container berth.

3) Technical Material Department (126 staff):

Mainly responsible for the purchase, storage, maintenance and repair of cargo handling machinery and others.

### 3.5.2 Technical Aspects of Operation and Maintenance

The Admin-Personnel Department of the Executing Agency is responsible for staff training. In fact, many employees participate in trainings held inside and outside Cambodia. In 2010-2011 alone, 118 people participated in the overseas trainings. In addition, many staff participated in the training held inside the country though the exact number is unknown. Training courses are given on various subjects such as human resource management, crane operation, investment promotion and so on. In addition to these courses, on-the-job (OJT) training is provided as needed by experienced staff.

The departments responsible for the operation and maintenance such as 1), 2) and 3) above have many staff with sufficient qualifications including the license for the operation of cargo handling machinery. According to the Executing Agency, they intend to make further efforts to recruit outstanding people with good qualifications and specialized technical skills, for example, asking domestic universities.

### 3.5.3 Financial Aspects of Operation and Maintenance

Table 3 shows the trends in the budget allocated for the operation and maintenance of Sihanoukville Port over the past four years. In a view of the Executing Agency, the budget is sufficient to carry out the work related to the operation and maintenance. The operation cost was high in 2008 because of the global hike in the diesel fuel price.<sup>32</sup> According to the Executing Agency, sufficient budget is also available for the purchase of spare parts.

Table 3: Operation and Maintenance Budget of the Executing Agency

(Unit: Thousand USD)					
Year	2007	2008	2009	2010	2011
Operation Budget	5,670	7,853	4,357	4,715	5,154

<sup>32</sup> The expense was especially high in 2008 because they purchased fuel not only for that year but also for the next few years.

Maintenance Budget	1,724	2,085	2,054	2,364	2,151
Total	7,394	9,938	6,411	7,079	7,665

Source: Answers on questionnaires.

Table 4 is the Profit-and-Loss statement (P/L) of the Executing Agency for the past three years.

Table 4: P/L of the Executing Agency

(Unit: Million Riel\*)

	2008	2009	2010
Operating revenue	109,583	91,672	107,394
Non-operating income	2,834	1,946	1,878
Operating cost	98,416	74,873	88,052
Operating profit or loss	14,001	18,745	21,220
Finance cost and repayment of debt	6,115	8,034	8,993
Pretax profit or loss	7,886	10,711	12,228
Tax	1,557	2,143	2,446
Current term net profit or loss	6,309	8,568	9,782

Source: Documents provided by the Executing Agency.

Note) The currency exchange rate is approximately 4,000 Riel for 1 USD.

The financial reports have ended in the black for the past three years. The main revenue of the Executing Agency comes from the port usage fees and cargo handling fees. Other revenues come from the land lease, water supply for the vessels, warehouse rent and so on. With regard to the operating cost, the expenditure on diesel fuel accounts for a big proportion.<sup>33</sup> In fact, as the expenses on fuel increase, operation of the cranes and trailers inside the facilities become more costly, and it will be added to the port usage fees collected from the shipping companies. The Executing Agency is exploring a way to shift to a direct purchase of electricity by 2013 instead of purchasing diesel to generate power necessary for the operation of the cranes and others. There is a prospect that the country's hydroelectric power generation facility and power network will be developed in the near future. It will reduce the electricity price, making it reasonable for the port operation.<sup>34</sup> Of the operating cost, salaries also account for a relatively big proportion, and there seems to be room for improvement. If the Executing Agency implemented these cost cuts, their financial situation would improve further, and the port usage fees would be reduced.

<sup>33</sup> There is a diesel power generation facility inside the port. Its maximum power output is 3MW, and it generates and supplies electricity for the different facilities. The purchase of diesel fuel is for the power generation within the facilities.

<sup>34</sup> While it would cost the Executing Agency 0.38USD/kW to purchase electricity from the power company today, the price is projected to be 0.20USD/kW in the near future. In fact, the "Greater Mekong Power Network Development Project" co-financed by ADB and JICA is ongoing, which is building the electric power transmission line and building/upgrading the electric power substation and electricity distribution lines around Sihanoukville Province. The installation of the transmission network is expected to be completed around Sihanoukville Province by 2013.



Ultimately, it could lead to the improved service delivery for the clients or shipping companies. Then, Sihanoukville Port would be well-positioned to compete with other ports such as Phnom Penh Port and Cai Mep-Thi Vai Port of southern Vietnam.

In any case, the Executing Agency has been able to secure net profits after expending operation and maintenance cost of Table 3 from the operation cost in Table 4. Therefore, no major problems are observed in the financial management of the Executing Agency at the time of the ex-post evaluation. It is worth noting that there is no subsidy and such from the Ministry of Public Works and Transport and the Ministry of Economy and Finance.

**【JICA’s Approach to Enhancing Competitiveness of Sihanoukville Port】**

Currently, JICA is implementing the “Project for the Study on Strengthening Competitiveness and Development of Sihanoukville Port” (a Technical Cooperation Project to be completed in June 2012) in order to develop key strategies for the port development with the objective of enhancing competitiveness of Sihanoukville Port. As discussed in the “Quantitative Effects” section earlier, Sihanoukville Port needs to compete with other ports, such as Phnom Penh Port and Cai Mep-Thi Vai Port of southern Vietnam, and there is a need to further reinforce the organizational structure and deliver more efficient port services. Considering such circumstances, JICA has dispatched a project team consisted of several experts, with the objectives of improving the port management capacity, streamlining cargo handling works, and increasing transparency in the financial management. The project team will present a set of recommended measures to the Executing Agency in order to improve and enhance competitiveness of the port. The Executing Agency intends to make further efforts to improve their organizational structure and port services based on the recommendations.

#### 3.5.4 Current Status of Operation and Maintenance

As discussed above, the operation and maintenance of the project is carried out by the Container Yard Operation Department (responsible for the operation and maintenance of the container terminal, container yard and cargo handling machinery), the Harbor Master Department (responsible for the operation and maintenance of the container berth), the Technical Material Department and the Machinery Department (responsible for purchase and storage of spare parts, maintenance and repair of cargo handling machinery and others). No

problems have been observed in the operation and management through the field study and interviews conducted during this evaluation study.

The port operation is manned 24 hours a day. Maintenance and repair workshops are available inside the facilities, and they can handle the maintenance and repair by themselves. In addition, sufficient spare parts are reserved.



Figure 11: Repair Workshop inside the Port



Figure 12: Inside the Port

In line with the above, no major problems have been observed in operation and maintenance of the project in terms of its structure, technical and financial aspects, therefore sustainability of the project effect is high.

#### **4. Conclusion, Lessons Learned and Recommendations**

##### **4.1 Conclusion**

At the time of the ex-post evaluation, it is confirmed that this project is relevant with the policy of Cambodia such as the transportation infrastructure development plan. It is also confirmed that the project is relevant with the development needs of the country such as port improvement and expansion. The project increased the container cargo handling volume increased at Sihanoukville Port. The project generally met its targets on the number of vessels entering the port, the gross tonnage, the berth occupancy rate, and the crane operating rate. Both the efficiency and the safety of the operation of the cargo handling machinery have improved. Furthermore, the project is responding to the increasing demand for cargo transportation, thereby contributing to the vitalization of the hinterland economy. While the project period slightly exceeded the initial plan, the project cost was within the plan. No major problems have been observed in the structural, technical and financial aspects of the operation and maintenance by the Executing Agency. In light of above, this project is evaluated to be highly satisfactory.

## 4.2 Recommendations

### (Recommendations to the Cambodian Side)

- High cost of diesel is an issue that needs to be addressed with regard to the operation and utilization of the cargo handling machinery and other port facilities. It is desirable for the Executing Agency to improve its productivity by taking further steps to reduce costs, such as shifting to inexpensive power supply as soon as possible. By improving productivity, the port usage fees will be reduced for the shipping companies, and the Executing Agency will be able to enhance its organizational structure that ultimately attracts cargo demands.
- Many trucks and trailers are found in front of the gate of the container terminal on weekends, and congestion is serious for the transportation and customs-related works for the container cargos. This is mainly because many vessels enter the port on weekends, requiring loads to be brought to the port near the weekends. The vehicles carrying the loads in fact disturb the traffics in the neighboring areas during some hours. Since there is limitation about traffic control and vehicle guidance, it is worth considering the possibility of widening the roads near the terminal gate, while making efforts to streamline the customs-related works and improve the operational efficiency of the staff.

## 4.3 Lessons Learned

- The HIV/AIDS prevalence rate was high around the time of the project commencement in 1999. On the other hand, the condom use rate was low, and there was insufficient knowledge about HIV/AIDS among the general population in Cambodia. Efforts were made to prevent the HIV/AIDS infections from increasing among the port construction workers, such as implementing a pilot initiative, adding sub-clause on HIV/AIDS in the contractor's contract, holding sessions, implementing advocacy work, and promoting condom use. As a result, there was no infection as far as the Executing Agency could detect. It is judged that these initiatives minimized the negative social impacts of the project such as HIV/AIDS infections among the port construction workers and worsening of their health. In addition, negative impact on the construction was minimized, and it is judged that the implementation of the HIV/AIDS program was beneficial considering its future impacts on the local society.

Comparison of the Plan and Actual Scope of the Project

Item	Plan	Actual
1. Project Outputs	<p><b>【Urgent Rehabilitation Project】</b> [Civil Works] 1) Construction of Container Berth: 240m 2) Construction of Container Yard (land reclamation): 60,000m<sup>2</sup> 3) Dredging: 877,875m<sup>3</sup> (Depth: -8.5m/-9.0m)</p> <p>[Consulting Services] 166.5M/M (Foreign: 83.5M/M, Local: 83.0M/M)</p> <p><b>【Urgent Expansion Project】</b> [Civil Works] 1) Expansion of Container Berth: 160m 2) Dredging: 400,000m<sup>3</sup> [Procurement] Procurement of Cargo Handling Equipment: two Gantry Cranes; five Transfer Cranes; Container Terminal Operating Management System (CTMS); and others.</p> <p>[Consulting Services] 247.0M/M (Foreign: 82.0M/M, Local: 165.0M/M)</p>	<p><b>【Urgent Rehabilitation Project】</b> [Civil Works] 1) As planned. 2) 67,135m<sup>2</sup> 3) 833,836m<sup>3</sup> (-9.0m/-10.0m)</p> <p>[Consulting Services] As planned.</p> <p><b>【Urgent Expansion Project】</b> [Civil Works] 1) As planned. 2) 588,000m<sup>3</sup> [Procurement] As planned.</p> <p>[Consulting Services] 210.0M/M (Foreign: 70.0M/M, Local: 140.0M/M)</p> <p><b>【Additional Output】</b> Dredging: 130,230m<sup>3</sup> (dredge volume)</p>
2. Project Period	<p><b>【Urgent Rehabilitation Project】</b> September 1999 – March 2004 (55 months)</p> <p><b>【Urgent Expansion Project】</b> November 2004 – November 2008 (49 months)</p>	<p><b>【Urgent Rehabilitation Project】</b> September 1999 – October 2006 (86 months)</p> <p><b>【Urgent Expansion Project】</b> November 2004 – March 2010 (65 months)</p>
3. Project Cost	<p><b>【Urgent Rehabilitation Project】</b></p>	<p><b>【Urgent Rehabilitation Project】</b></p>
Amount paid in Foreign Currency	3,253 million yen	2,656 million yen
Amount paid in Local Currency	1,817 million yen	2,083 million yen
Total	5,070 million yen	4,739 million yen

Japanese ODA Loan portion	4,142 million yen	3,917 million yen
Exchange Rate	1USD = 119 yen (As of September 1999)	1USD = 118.26 yen (Average over the project period)
	<b>【Urgent Expansion Project】</b>	<b>【Urgent Expansion Project】</b>
Amount paid in Foreign Currency	3,798 million yen	3,927 million yen
Amount paid in Local Currency	1,691 million yen	992 million yen
Total	5,489 million yen	4,919 million yen
Japanese ODA Loan portion	4,313 million yen	3,921 million yen
Exchange Rate	1USD = 124 yen (As of November 2004)	1USD = 114.90 yen (Average over the project period)