FY2023 Simplified Ex-Post Evaluation Report of Japanese Grant Aid Project
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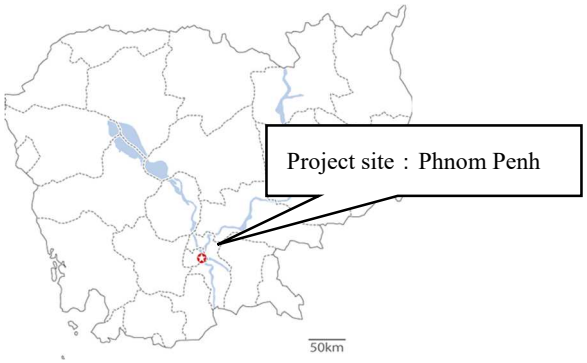
Duration of the Study: November 2023–February 2025
Duration of the Field Study: March 15th, 2024 – March 30th, 2024

Country Name	The Project for Rehabilitation of the Chroy Changwar Bridge
Kingdom of Cambodia	



Location of the project site (source: JICA)

Vehicles passing over the Chroy Changwar Bridge (Source: Evaluator)

I. Project Outline

Background	With Cambodia's economic development, traffic volume rapidly increased, leading to the advancement of road and bridge infrastructure. The Chroy Changwar Bridge (hereinafter referred to as "the bridge"), located at the origin of National Road 6A in northern Phnom Penh, was provided by Japan in 1963. However, due to the civil war, part of the bridge was destroyed in a blast, rendering it unusable for a long period. In 1992, the bridge was rehabilitated using Japan's Grant Aid and was named the "Cambodia-Japan Friendship Bridge (Japan Bridge)."The bridge was not only an essential route for commuting and in daily life for residents in northern Phnom Penh but also a vital transportation and logistics hub connecting the capital with the nine northeastern provinces,[1] known for their thriving agriculture and forestry industries. In 2012, the traffic volume on the bridge, measured in Passenger Car Units (PCU),[2] reached 39,599 PCU/day, exceeding the bridge's capacity of 30,000 PCU/day and resulting in congestion. In response to the growing traffic demand, the government of Cambodia opened the Second Chroy Changwar Bridge (China Bridge) in 2014 with financial assistance from China, and together with the Japan Bridge, operated both bridges with a total of four lanes. However, the approach section of the bridge experienced damage to its bearings and girders due to an increase in heavy vehicle traffic. While emergency repairs were conducted in 2013, new damage was discovered in 2014. Afterward the passage of large vehicles was restricted, causing significant disruptions to smooth traffic flow. As a result, the full-scale rehabilitation and reinforcement of the bridge, through the implementation of the Project for Rehabilitation of the Chroy Changwar Bridge (hereinafter referred to as "the project"), became an urgent necessity.
Objectives of the Project	To ensure safe and smooth traffic and logistics on National Route No. 6A between the capital city Phnom Penh and the Chroy Changwar area in the northern part of the capital city by repairing and rehabilitating the Chroy Changwar Bridge in the section, thereby contributing to improving access to public facilities and stimulating the local economy.
Contents of the Project	1. Project Site: Phnom Penh Municipality 2. Japanese side (1) Civil Works ((i) Replacement of the main bridge approach section (PC bridge)), (ii) Repair of the superstructure, pavement, and painting of the bridge surface at the main bridge crossing section (steel bridge), (iii) Repair of the substructure, (iv) Improvement and pavement of the access road, (v) Installation of the incidental facilities) (2) Consulting Services/Soft components (detailed design, construction supervision, technical instruction through on-the-job training for bridge design and construction) 3. Cambodian side: Land acquisition and resettlement, utility relocation costs, etc

Implementation Schedule				
	E/N Date	March 21, 2016	Disbursement Date	—
	G/A Date	March 31, 2016	Completion Date	April 3, 2019

[1] Nine northeastern provinces refer to Ratanakiri, Mondulkiri, Stung Treng, Kratie, Preah Vihear, Kampong Thom, Kampong Cham, Oddar Meanchey, and Siem Reap provinces.
[2] PCU stands for Passenger Car Unit, a unit used to convert traffic volumes of various vehicle types into an equivalent volume of passenger cars. It is used to standardize and measure the actual traffic flow in terms of passenger car traffic.

				(commissioning)
Project Cost	E/N Grant Limit / G/A Grant Limit: 3,343 million yen, Actual Grant Amount: 2,672 million yen			
Executing Agency	Road Infrastructure Department (RID), Ministry of Public Works and Transport (MPWT)			
Contracted Agencies	Main Contractor: Obayashi Corporation (Japan) Main Consultant: Central Consultant Inc. (Japan)			

II. Result of the Evaluation

<Summary>

The project was to ensure safe, smooth transportation, and logistics between the Phnom Penh municipality and the Chroy Changwar area by rehabilitating the bridge. Therefore, the objectives of the project were consistent with Cambodian development policies and needs. As operation and effect indicators, although an increase in the use by large vehicles was initially set, but due to the continued implementation of passage restrictions for large vehicles on the bridge after the rehabilitation, alternative indicators were required at the ex-post evaluation. However, the project plan and approach at the time of the ex-ante evaluation were appropriate. Regarding internal coherence, the road and bridge maintenance manuals developed under the technical cooperation project "The Project for Strengthening Capacity for Maintenance of Roads and Bridges" (2015-2018) were also utilized in the project, contributing to safe and smooth transportation. In terms of external coherence, there was no coordination or collaboration between the project and other organizations or donors. Consequently, the relevance and coherence of the project are evaluated as high. The effectiveness was confirmed using alternative operation and effect indicators, not the original indicators set out above. The indicator of "Increase in mean travel speed on the Chroy Changwar Bridge only (km/h)" showed only a slight increase and did not meet the target, but the indicator of "Increase in the use of all vehicles (PCU/day)" achieved the target. In terms of impacts, in addition to improvements in convenience as a community road, business expansion and job creation can be seen, leading to the employment promotion around the bridge. Therefore, effectiveness and impacts of the project are evaluated as high. There were many design changes made to the output due to repairs to exposed aggregate sections of the bridge piers, changes in pile length, etc., but these did not affect the project effects. Although the project period exceeded the plan, the project cost was within the plan, so the efficiency is high. Some problems have been observed in terms of the financial aspect due to the insufficient annual budget of the Department of Public Works of Phnom Penh (DPWT), which is responsible for operation and maintenance. Thus, the sustainability is evaluated as moderately low. In light of the above, this project is evaluated to be satisfactory.

Overall Rating[3]	**B**	**Relevance & Coherence**	③[4]	**Effectiveness & Impacts**	③	**Efficiency**	③	**Sustainability**	②

<Special Perspectives Considered in the Ex-Post Evaluation／Constraints of the Ex-post Evaluation>

Operation and effect indicator 1 (Increase in mean travel speed between Point A and B (km/h)): The average travel speed was calculated by making several round trips between a point located 720 meters from the roundabout on the west bank (Point A) and a point located 690 meters from the roundabout on the east bank (Point B), between 06:00-09:00 and between 16:00-19:00. However, at the ex-post evaluation, significant congestion was observed near Point A, which had not been anticipated during the ex-ante evaluation and which had a substantial impact on the average travel speed. Therefore, to properly assess the project effects, an alternative indicator, "Increase in mean travel speed on the Chroy Changwar Bridge only," was set.

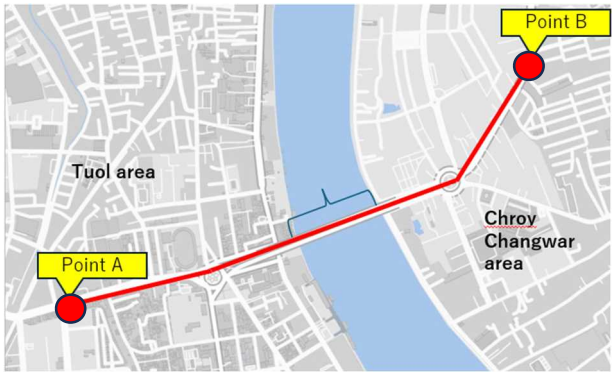


Figure 1: Measurement range of conventional average driving speeds

Operation and effect indicator 2 (Increase in the use by large vehicles (vehicles/day)): At the ex-ante evaluation, the indicator was set based on the assumption that vehicles over five tons would be able to use the bridge after its rehabilitation. However, in October 2018, before the project was completed, the Governor of Phnom Penh announced that the entry of large vehicles into the city would continue to be restricted throughout the day, resulting in large vehicles being unable to pass over the bridge. Consequently, it became necessary to revise the operation and effect indicator. In this evaluation, "Increase in the use of all vehicles (PCU[5]/day)" was set as an alternative indicator. The alternative indicator was established by setting the baseline and target values based on the figures from the Preparatory Survey Report[6] of the project.

[3] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[4] ④:Very High ③: High, ②: Moderately low, ①: Low

[5] In order to appropriately reflect the impact of different types of vehicles on the main bridge, PCU is used instead of the number of vehicles passing through (vehicles/day).

[6] The Preparatory Survey Report (p.93, p.94 and p.156) assumed the construction of the new bridge and the implementation of the traffic system, so the number of vehicles passing over the bridge (PCU/day) is estimated to be 27,310 PCU/day in the project completion year (2019) and is projected to remain unchanged thereafter. Therefore, even in the target year (2024), the number of vehicles passing over the bridge (PCU/day) remains at 27,310 (PCU/day).

Table 1: Original Operation and Effect Indicators and Alternative ones

	Original Operation and Effect Indicators	Alternative Indicators
1	Increase in mean travel speed between Point A and B (km/h)	Increase in mean travel speed on the Chroy Changwar Bridge only (km/h)
2	Increase in the use by large vehicles (vehicles/day)	Increase in the use of all vehicles (PCU/day)

1 Relevance/Coherence

<Relevance>

・Consistency with the Development Policy of Cambodia at the Time of Ex-Ante Evaluation

In the *National Strategic Development Plan* (2014–2018), which was in effect at the ex-ante evaluation, infrastructure development was identified as one of the four key sectors. The key issues to be addressed in infrastructure development included "development of transport and urban infrastructure," and the plan set out a policy goal to develop 3,500 km of roads during the period of the plan. In addition, the plan's core concept of "good governance" emphasized strengthening investment in transportation infrastructure, including bridges, from the perspective of sustainable growth, with specific reference to the development of transportation systems in rural areas.

・Consistency with the Development Needs of Cambodia at the Time of Ex-Ante Evaluation

The bridge was located to the north of the capital Phnom Penh and was the starting point of National Route 6A, an important commuting road for residents in northern Phnom Penh, and one which was used by residents on a daily basis. The road was also a key transport and logistics hub connecting the capital with the nine provinces in the northeast, where agriculture, forestry, and related industries were thriving. However, due to the increase in heavy vehicles using the approach bridge, damage to the bearings[7] and the edges of the bridge girders was seen, and there was the need to prevent serious accidents, such as the bridge collapsing, so large vehicles were restricted from passing over the bridge at the ex-ante evaluation. As a result, there was a significant obstruction to the smooth flow of traffic on National Route 6A, and a full-scale renovation and reinforcement of the bridge was required.

・Appropriateness of Project Design/Approach

When design changes become necessary, the construction supervision consultant has to submit its application to JICA in advance. For the project, many design changes were made during the construction period, such as repairs to exposed aggregate areas on bridge piers and changes to pile length. In order to accommodate the request from the Cambodian government and meet the tight schedule, the construction supervision consultant occasionally proceeded without prior application. However, despite the large number of design changes, it had not been possible to confirm detailed information regarding underground structures at the ex-ante evaluation, and these design changes could not have been anticipated. Therefore, the project approach and approach at the time of the ex-ante evaluation were appropriate.

<Coherence>

・Consistency with Japan's ODA Policy at the Time of Ex-Ante Evaluation

The project was consistent with the Japan's *Country Assistance Policy for Cambodia* (2012) at the time of ex-ante evaluation. One of the priority areas for support in the policy included "strengthening the economic base," with a focus on improving transportation networks and logistics systems. Additionally, the *JICA's Country Analytical Paper for Cambodia* (2014) highlighted the need for developing economic infrastructure, such as road network improvements and the enhancement of logistics systems.

・Internal Coherence

At the time of the ex-ante evaluation, it was assumed that there would be coordination with the JICA technical cooperation project "Capacity Building for Road and Bridge Maintenance Project" (2015–2018). The maintenance manuals and bridge database developed under the aforementioned project were utilized by RID (MPWT) and Phnom Penh DPWT, which is responsible for operation and maintenance. The implementation of proper operation and maintenance has contributed to the continuous project effects and to ensuring smooth transportation. Therefore, the internal coherence of the project is ensured.

・External Coherence

Any cooperation/coordination with other donors was not clearly planned at the time of ex-ante evaluation or during the project.

<Evaluation Result>

In light of the above, the relevance and coherence of the project are high.[8]

2 Efficiency

(Output)

At the ex-ante evaluation, detailed information regarding underground structures could not be confirmed, which made it difficult to fully grasp the situation. As a result, many design changes were necessary during the construction period, including repairs to exposed aggregates on the bridge piers and changes to the pile length. However, as there were no major changes that

[7] A bearing is a component that is installed between the superstructure (main girder, main structure) and the substructure (bridge abutment, bridge pier).

[8] Relevance: ③, Coherence: ③

affected the project effects, the outputs of the project were generally as planned, as described in the "1. Project Overview: Contents of the Project" section above.

(Input)
1) Project cost
The planned cost was about 3,540 million yen (Japanese side: 3,343 million yen, Cambodian side: 197 million yen), but the actual cost was about 2,818 million yen (Japanese side: 2,672 million yen, Cambodian side: 146 million yen). Therefore, the project cost was within the plan (the ratio against the plan: 80%).

2) Project period
The project period was initially planned to run from March 2016 to September 2018 (30 months), but the actual period was from March 2016 to April 2019 (38 months), which was longer than planned (the ratio against the plan: 127%). The main reason for this was delays in work such as for the relocation of residents and the relocation of utilities.

<Evaluation Result>
Although the project cost was within the plan, the project period exceeded the plan due to work delays related to resident relocation and utility relocations. Therefore, the efficiency of the project is high.

3 Effectiveness/Impacts[9]

<Effectiveness>
(Quantitative Effects)
The indicators for the quantitative effects of the project were "Increase in mean travel speed (km/h) between Point A and B" and "Increase in the use by large vehicles (vehicles/day)" (See Table 1). However, based on the "Special Perspectives Considered in the Ex-Post Evaluation/Constraints of the Ex-post Evaluation," the following alternative indicators were used for this evaluation.

- Increase in mean travel speed on the Chroy Changwar Bridge only (km/h): The average speed on the bridge shows some improvement but did not reach the target (from 26.8 km/h to 30.0 km/h). The main factor is thought to be the increase in traffic volume due to the increase in the population of Phnom Penh. If the original operation and effect indicator (see Figure 1 and "Special Perspectives Considered in the Ex-Post Evaluation/Constraints of the Ex-post Evaluation") is used, the average speed of the travel section is 22.1 km/h.
- Increase in the use of all vehicles (PCU/day): The number of vehicles passing over the bridge greatly exceeds the target due not only to the increase in traffic volume accompanying the population growth of Phnom Penh and the development of the eastern shore of Phnom Penh, but also to the improved convenience following the renovation of the bridge.

Table 2: Quantitative Effects

Indicators	Baseline 2015 Baseline Year	Target 2021 3 Year(s) after Completion	Actual 2024 3 Years after Completion
Indicator 1 Increase in mean travel speed on the Chroy Changwar Bridge only (km/h)	26.8[10]	40.0	30.0
Indicator 2 Increase in the use of all vehicles (PCU/day)	24,420	27,310	53,899

Source: The baseline year and target year were quoted from the Preparatory Survey Report, and the actual values were measured by the evaluator.

<Impacts>
(Qualitative Effects)
The qualitative effects of the project were expected to be "improvement of access to social infrastructure (schools, hospitals, workplaces)" (Qualitative Effect 1) and "vitalization of the local economy through the stable transport of agricultural products from the nine northeastern provinces to Phnom Penh" (Qualitative Effect 2). Regarding Qualitative Effect 1, an interview[11] with the manager of a hospital located on the east bank of the bridge revealed that the rehabilitation of the bridge had led to improvements in, and expansion of medical services, including reduced emergency transport times, the introduction of mail-order pharmaceutical services, and enhanced collaboration with nearby hospitals. Additionally, interviews with students at a

[9] When providing the sub-rating, Effectiveness and Impacts are to be considered together.
[10] During the preparatory survey, the average speed of the Chroy Changwar Bridge only was not measured, which made a precise comparison between the planning phase and the post-evaluation phase difficult. However, unlike at the time of the post-evaluation, there was no traffic congestion near point A during the preparatory survey, allowing for stable travel speed from point A to point B. It is assumed that the passage over the Chroy Changwar Bridge was at 26.8 km/h.
[11] Interviews were conducted with a total of 25 individuals. The breakdown of interviewees is as follows: ((i) East bank of the bridge: 4 local residents, 4 university students, and 4 hospital patients. (ii) West bank of the bridge: 5 local residents, 2 fresh produce shop owners in the market, and 5 wholesalers. (iii) Around Skun (northern Phnom Penh): 4 truck drivers.)

university on the east bank of the bridge indicated that the short commuting time was one of the main reasons for their choice of university, suggesting that the bridge contributes to increased educational opportunities. Furthermore, local residents around the bridge mentioned that congestion, particularly outside peak commuting hours, has eased compared to before the rehabilitation. On the other hand, with regard to Qualitative Effect 2, interviews were conducted with residents and wholesalers, and it was found that agricultural and forestry products from the nine northeastern provinces are expected to be exported to Vietnam and they are rarely transported into Phnom Penh due to the restriction on large vehicles passing over the bridge. Therefore, while the impact originally anticipated for Qualitative Effect 1 was confirmed, the expected impact of Qualitative Effect 2 was not realized. As described in the section below on "Other Impacts," the number of people traveling across the bridge for business purposes in Phnom Penh increased, and although this was not connected with the nine northeastern provinces, economic revitalization was confirmed.

(Other Impacts)

① Impacts on the natural environment

The project was classified as Category B in the *JICA Guidelines for Environmental and Social Considerations* (2010) because the negative impact on the environment was not considered significant, and measures to prevent air pollution, water pollution, waste, and noise were required. During the project, regular monitoring was carried out, and apart from water pollution, no negative impact on the natural environment was confirmed. With regard to water pollution, the pH of the wastewater from construction sites and similar sources increased, but this was dealt with quickly by adding aluminum sulphate to the sampling water to lower the figures, and no abnormal figures were detected from the time the countermeasures were taken until the bridge was put into operation. In addition to the above, there were no complaints from residents regarding the project, so it can be said that there were no major problems overall.

② Impacts on the social environment

The project implementation was expected to involve the land acquisition from 21 households and the involuntary resettlement of residents. Although the specific amount of land acquired and the number of involuntary resettled people were not available, according to the executing agency, these actions went as planned appropriately in accordance with Cambodian domestic procedures and the abbreviated resettlement plan. In addition, while information on how the affected residents' requests for compensation were handled was not available, there were no complaints from the affected residents.

③ Impacts related to gender

Gender-related activities were not anticipated at the time of the ex-ante evaluation, and no particular impact on gender was observed at the post-evaluation.

④ Other positive/negative Impacts

According to interviews with residents living near the bridge, it was confirmed that the increase in traffic due to the renovation of the bridge led to business expansion, the promotion of entrepreneurship, and the promotion of employment (opening of tire sales shops, increase in the number of employees at retail shops and restaurants). In particular, fresh food wholesalers actively utilize the bridge to visit their customers, taking advantage of the fact that the congestion outside of peak hours has eased. They actively try to expand their business.

<Evaluation Result>

Due to the project implementation, the effects were observed as planned, and the effectiveness and impacts of the project are high.

4 Sustainability

・Policy and System

At both the time of ex-ante evaluation and ex-post evaluation, the National Strategic Development Plan emphasized infrastructure development in the transportation sector, and the rehabilitation of the bridge was included at the time of the ex-post evaluation. Additionally, the latest *National Strategic Development Plan* (2024–2028) is currently being formulated and is expected to be published in the latter half of 2024. Therefore, as there have been no policy or institutional changes that would undermine the project effects, there are no issues concerning the sustainability of policies and systems. Moreover, the *Phnom Penh Sustainable City Plan* (2018–2030) mentions the reduction of traffic congestion, and it is expected that the restriction on large vehicles entering the Chroy Changwar Bridge will continue.

・Institutional/Organizational Aspect

The bridge operation and maintenance system in Phnom Penh is supervised by the implementing agency, RID (MPWT), while the Phnom Penh DPWT, a local branch, is responsible for daily and regular maintenance. According to the Phnom Penh DPWT, more than 300 staff members (including temporary workers) are assigned across three departments, ensuring that sufficient personnel are available for maintenance tasks. Additionally, daily maintenance, including road surface cleaning of the bridge, is outsourced by Phnom Penh City Hall (PPCA) to CINTRI Cambodia.[12] As for periodical maintenance (such as close-up inspections, repairs of damaged areas, and pavement overlays), RID (MPWT) refers to the bridge database and instructs Phnom Penh DPWT to carry out maintenance as necessary. As described above, the roles are clearly defined, and no organizational or systemic issues that would impair the realization of the project effects have been identified.

・Technical Aspect

The manuals on road and bridge maintenance created under the JICA technical cooperation project "Capacity Building for

[12] CINTRI Cambodia is a company that primarily provides waste management and cleaning services in Cambodia's capital, Phnom Penh.

Road and Bridge Maintenance Project" (2015–2018) have not been revised but continue to be used by RID (MPWT) and Phnom Penh DPWT. As for training, RID (MPWT) regularly conducts sessions for DPWT. Cambodia is divided into three regions, with one training session per region each year, and two participants attend from each province. Each training session lasts for one day, focusing on road assets such as roads and bridges, with a specific theme chosen for each session. In 2023, two officials responsible for road and bridge maintenance from Cambodia participated in JICA's Group and Region-Focused Training on "Road Maintenance" (which includes bridge maintenance). In April 2024, a special on-site training session was held, inviting overseas companies as instructors to introduce the latest technology for road and bridge operation and maintenance. In the project, a steel fiber-reinforced concrete (SFRC) pavement, which has excellent durability, was adopted. However, since the maintenance procedures are the same as for regular concrete, Phnom Penh DPWT has been able to manage with their existing capabilities and equipment. On the other hand, the use of SFRC has not contributed to a reduction in the burden of routine maintenance tasks. In conclusion, there are no technical issues.

・Financial Aspect

The operation and maintenance budget for Phnom Penh DPWT is allocated by PPCA, not by RID (MPWT). Therefore, the financial evaluation was based on the operation and maintenance budget of Phnom Penh DPWT, not RID (MPWT) (see Table 3).

Table 3：Actual Budget for Operation and Maintenance of the Phnom Penh DPWT

（Unit：10000 USD）

Year	2015(Assumed amount required)*	2021	2022	2023
Budget for operation and maintenance	51.7	14.2	16.8	23.7

Source: Phnom Penh DPWT、Project monitoring report

*The budget of operation and maintenance assumed at the time of the ex-ante evaluation.

At the time of the ex-post evaluation, the operation and maintenance budget for roads and bridges of Phnom Penh DPWT has been on the increase for three consecutive years, and daily maintenance work has been carried out appropriately. In addition, the financial burden on the Phnom Penh DPWT is somewhat reduced by the fact that the PPCA has contracted CINTRI Cambodia to clean the road surface of this bridge, which is part of daily maintenance. However, even taking this into account, the daily maintenance budget is inadequate to meet the initial assumption. Furthermore, according to the Phnom Penh DPWT, there are no plans to carry out regular maintenance of the bridge, and Table 3 is considered to be a budget for daily maintenance only, which means that the initially assumed budget for operation and maintenance has not been secured. Therefore, there are some issues in financial sustainability, and the prospects for improvement and resolution are low.

・Environmental and Social Aspect

As stated in the 'Impacts' section above, water pollution problems occurred due to wastewater from construction sites, etc., but no major negative environmental and social impacts have occurred since the measures were taken. For the time being, no major negative impacts, including water pollution, are envisaged.

・Preventative Measures to Risks

Based on the intention of the Cambodian government, it was not possible to restrict traffic on the Chroy Changwar Bridge for more than 21 months. Therefore, through the implementation of a detailed schedule and other measures, the traffic restriction period was reduced to 19 months, two months shorter than planned. However, as stated in "Appropriateness of Project Design/Approach" in order to shorten the project period, the construction supervision consultant did not apply in advance for design changes and was subject to measures against shoddy work. No serious problems in terms of construction quality have arisen, and the project is therefore considered to be unproblematic.

・Current Status of Operation and Maintenance

Although there was minor damage to the bridge and approach road, repairs were carried out and no serious damage that would affect the project effects was found. The missing drain covers and cracks in the Chinese side embankment are scheduled to be repaired soon, and illegal dumping and parking were observed under the elevated section. However, according to RID (MPWT) and Phnom Penh DPWT, these areas are planned to be cleaned up and utilized as part of a park. Therefore, while there are some issues in the current status of the operation and maintenance, improvements are expected.

<Evaluation Result>

In light of the above, some problems have been observed in terms of the financial aspects of the implementing agency. Therefore, the sustainability of the project effects is moderately low.

III. Recommendations & Lessons Learned

・Recommendations to Executing Agency

- Stairs leading to the embankment were installed on both sides of the bridge, but both are littered with garbage, making the stairs slippery. Since it is expected that workers will use these stairs during daily and regular inspections, it is desirable that Phnom Penh DPWT clean the stairs regularly or to request that CINTRI Cambodia, which is responsible for road cleaning, handle the task.
- Illegal dumping and parking have been observed under the overpass on the east side of the bridge. In urban areas where

land is scarce, spaces under elevated structures are highly valuable. According to Phnom Penh DPWT, it is envisioned that the space under the overpass will be utilized as a park, and it is necessary to consider both its use and the implementation of maintenance. Furthermore, it is desirable that the implementing agency, RID (MPWT), shares this recommendation with Phnom Penh DPWT to encourage the effective utilization of the space under the overpass. In addition, in the future, RID (MPWT) should consider using the space under the overpass as a paid parking lot as another source of income, and using the income from this to cover the cost of maintaining and managing the infrastructure.

・Recommendations to JICA
N/A

・Lessons Learned

(1) Description of the Process of Setting for Operation and Effect Indicators
Regarding the operation and effect indicator (Indicator 2: Increase in the use by large vehicles (vehicles/day)), there was no sufficient description of the process of setting this in the Preparatory Survey Report, making it difficult to verify and understand the project effect at the ex-post evaluation. In order to conduct an appropriate evaluation, it is essential that JICA include a detailed description of the process of setting the target values in the Preparatory Survey Report, and to keep the information and files used in the calculations until at least the completion of the ex-post evaluation.

(2) Measurement Range for Operation and Effect Indicators (Increase in mean travel speed on the Chroy Changwar Bridge only (km/h))
As for the setting of the operation and effect indicator (Increase in mean travel speed on the Chroy Changwar Bridge only (km/h)), the starting point was several hundred meters away from the roundabouts on both sides of the bridge, from which the average speed of multiple round trips was used. However, at the ex-post evaluation, there was congestion around the starting point, and many vehicles that did not use the bridge flowed in, which had a significant impact on the average travel speed. In order to accurately evaluate the project effect on the target bridge, the indicator should not have included travel sections that were not related to the project area, and the average travel speed on the target bridge alone should have been used as the indicator.

IV. Non-Score Criteria

・Performance
N/A

・Additionality
N/A

Approach road on the west bank of the Chroy Changwar Bridge (Source: Photographed by the evaluator)

Chroy Changwar Bridge as seen from the east embankment (Source: Photographed by the evaluator)

(end)