The Republic of the Philippines

Rehabilitation and Maintenance of Bridges Project (Phase IV)

External Evaluator: Ryujiro Sasao, IC Net Limited

1. Project Description

Project Site

Badoc Bridge

(One of the rehabilitated bridges)

1.1 Background

In the Philippines, the road network is the largest medium of transportation, handling about 90% of passenger transportation and 50% of freight transportation respectively. Because consideration of its functionality and quality was inevitably of secondary importance following concentrated investment to increase the road length until the early 1980s, many arterial national primary roads and national secondary roads serving as key road networks, were unpaved (pavement ratio: National Primary Roads 71%, National Secondary Roads 47% (1999)) and did not function sufficiently as trunk roads. Also, due to damage caused by natural disasters and a lack of alternative routes in emergencies, traffic efficiency is often inhibited. To promote domestic personnel and material interaction and support revitalization of local roads as well, the development of a safe and efficient arterial road network were required immediately.

1.2 Project Outline

The objective of this project is to secure the safety of transport between the metropolitan area and local areas and accelerate the flow of people and goods by reconstructing the deteriorated and damaged bridges along the Philippines-Japan Friendship Highway (the road section in Luzon island), which is the longest north-south highway in the Philippines and the Manila North Highway, which connects Metropolitan Manila and the northern Luzon island, thereby contributing to the economic development of the Luzon island.

Approved Amount / Disbursed Amount	5,068 million yen / 3,786 million yen
Exchange of Notes Date / Loan Agreement Signing Date	December, 1999 / December, 1999
Terms and Conditions	Interest Rate: 1.8%, 0.75% (consulting service) Repayment Period: 30 years (Grace Period: 10 years), 40 years (Grace Period: 10 years) for consulting

	service General untied (Bilateral tied for consulting service)
Borrower / Executing Agency(ies)	Philippine government / Department of Public Works and Highways
Final Disbursement Date	March 2007
Main Contractor (Over 1 billion yen)	Hanjin Heavy Industries & Construction Co., Ltd. (Korea)
Main Consultant (Over 100 million)	Demcor Inc.(Philippines)／TCGI Engineers(Philippines)／Techniks Group Corp.(Philippines)／Nippon Koei Co., Ltd. (Japan)／Katahira and Engineers International (Japan)
Feasibility Studies, etc.	F/S related to "Rehabilitation and Maintenance of Bridges along Arterial Roads Project" conducted by JICA(Completed in June, 1989)
Related Projects (if any)	1999-2007 Implementation of a Technical Cooperation Project on the maintenance of bridges by the dispatch of experts to DPWH (Road sector)(capacity building of the staff of DPWH), 1998-2005 Construction of rural road bridges (Grant aid)

2. Outline of the Evaluation Study

2.1 External Evaluator

Ryujiro Sasao, IC Net Limited

2.2 Duration of Evaluation Study

Duration of the Study: January 2010 - December 2010
Duration of the Field Study: 17 March - 10 April 2010, 8 June - 7 July 2010,
5 - 18 September 2010

2.3 Constraints during the Evaluation Study

None in particular

3. Results of the Evaluation (Overall Rating: B)

3.1 Relevance (Rating: a)

3.1.1 Relevance with the Development Plan of the Philippines

The development policy of the Philippines at the time of appraisal is shown in the development goal of transportation sector in the "New-medium term development plan (1999

- 2004) formulated under the Estrada Administration, namely to support the socioeconomic development of the Philippines by providing safe and reliable transportation service, with strategies to achieve this including (1) reduction of government involvement in road development and promotion of utilization of the private sector, (2) enhancing the quality of existing infrastructure through appropriate renovation and maintenance management, (3) introduction of an appropriate legal framework and price policy to nurture the competitive market, and so on. In particular, as priorities toward achieving the abovementioned (2), ① Ensuring the high standard of arterial national roads and decentralization of road links development, and ② The introduction of the user charge principle in road development are established. Primarily under the Department of Public Works and Highways (DPWH), sequential renovations of arterial national roads have been conducted, and the introduction of new funding sources in line with the user charge principle has been considered.
This project falls into the abovementioned category of "(2) enhancing the quality of existing infrastructure through appropriate renovation and maintenance management".

During the ex-post evaluation, in the "Medium Term Philippines Development Plan (2004-2010)", the development goals and strategies of traffic infrastructure sector are set out as follows and even after the project is conducted, the importance of developing the traffic network remains.

- Providing easier access to markets at home and abroad to alleviate poverty in the countryside and isolated regions;
- Enhancing peace and order in conflict-affected regions through efficient transport and trade;
- Strengthening national unity, family bonds and tourism by making the movement of people faster, cheaper and safer;
- Facilitating the decongestion of Metro Manila via a transport logistics system that would ensure efficient linkages between its business centers and nearby provinces; and
- Generating more transport infrastructure with minimal budget cover or contingent liabilities. Private sector-initiated infrastructure should be deficit-neutral, with minimum government exposure in the project.

3.1.2 Relevance with the Development Needs of the Philippines

The Philippines-Japan Friendship Highway, which runs the length of Luzon island, and the Manila North Highway play a very important role in terms of facilitating the flow of people and goods as the trunk roads in the island. Many of the bridges along these trunk roads were, however, constructed during the 1930s – 1960s and are old and damaged due to natural disasters, which threatens the safety and efficiency of transport. In September 1998, a bridge along the Manila North Highway collapsed as the result of flooding caused by a typhoon and there was an urgent need to rehabilitate and improve those deteriorated bridges.

The following table shows the statistics on typhoons having hit the Philippines in and after the year 2000. Luzon island is, in particular, relatively frequently hit by typhoons in the Philippines and exposed to the strong threat of typhoons. Accordingly, there was a need to strengthen the old bridges against the risk of typhoons. Particularly in 2009, 2 typhoons called "Pepeng" and "Ondoy" struck Luzon island and caused considerable damage (Table 2).

Table 1. Typhoon arrival on the Philippines

2000	01	02	03	04	05	06	07	08	09
9	5	4	10	12	10	12	9	14	18

Source：“National Disaster Coordinating Council - Civil Operations Center”, “Philippine Atmospheric Geophysical and Astronomical Services”

Table 2. Damages caused by typhoons “Pepeng” and “Ondoy”

Typhoon	Pepeng	Ondoy
Casualties	719	1,030
－ Dead	465	464
－ Injured	207	529
－ Missing	47	37
Damaged houses	54,373	185,004
Estimated cost of damage to infrastructure and agriculture	27.3 Billion Peso	10.9 Billion Peso

Source：”Situation Report No.50”, National Disaster Coordinating Council

In addition, traffic at each bridge has been increasing steadily since the project completion as shown in the following aspect of effectiveness, which confirms the development needs retroactively.

3.1.3 Relevance with Japan’s ODA policy

According to the “Overseas Economic Cooperation Policy” issued by JICA (former JBIC) in 1999, the following statement was included related to the Republic of the Philippines:

“Emphasis is placed on the support for strengthening the economic structure for the purpose of sustainable growth, poverty alleviation and improvement of economic gap among regions, the support for environment protection including disaster prevention, and human resource/institution development.” This project is related to “poverty alleviation and improvement of economic gap among regions”.

According to the appraisal materials, JICA had a policy of supporting the development of economic infrastructure development in the area of transportation and so on to ease bottlenecks in economic development, and secure the sustainable growth of the Philippines. In particular, concerning the development of arterial road links, and starting with the Japan-Philippines Friendship road related project, they had focused on the development of north-south arterial road links, with consideration of the elongated north-south national land structure of the Philippines until then, and also had a policy of engaging in the development of the arterial road linking east and west and circular roads in islands as well as north-south, to ensure the balanced development of the nation in future.

This project has been highly relevant with the country’s development plan, development needs, as well as Japan’s ODA policy, therefore its relevance is high.

3.2 Efficiency (Rating: b)

3.2.1 Project Outputs

The following chart shows the distribution of the project sites.

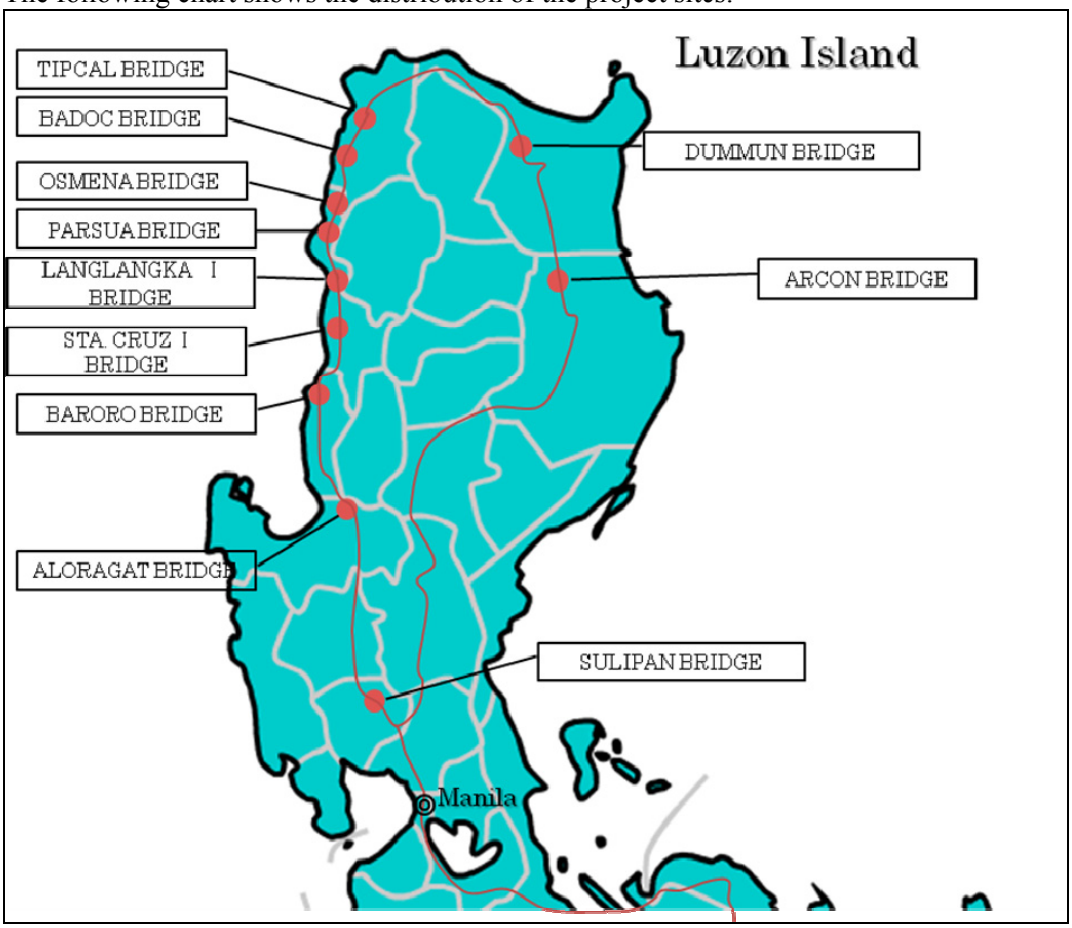

Chart 1. Location of bridges rehabilitated in the project in Luzon

Although there was no particular change of scope which affected the project purpose as a whole, only 11 bridges out of the 15 originally planned were rehabilitated.
First, detailed design research was conducted for 14 bridges other than Pamplona. 3 bridges such as Maasim II, Caba, San Isidro were, however, also targets of ADB's assistance and finally excluded from the scope of this project[1]. Eventually, Pamplona was also excluded from the project scope owing to budgetary constraints.

With regard to the remaining 11 bridges, rehabilitation was conducted almost as planned for 8 bridges and there was a relatively major change of design for 3 bridges.
Details of the scope change are shown below.

[1] These 3 bridges were rehabilitated with the ADB's assistance.

Table 3. Comparison of outputs (Plan and Actual)

Bridges	Plan		Actual		Major changes	Reasons of change
	Method*	Length (m)	Method*	Length (m)		
（Package I）						
1.Aloragat	PCDG	210.0	PCDG	210.6	Modification of the sub-structure of bridge	To eliminate the construction of cofferdam and pile cap in order to fast truck the work and also to strengthen the bridge structure
(Package II)						
2.Arcon	PCBG	150.0	PCDG	140	There is no major change.	
3.Pamplona	PCBG	490.0	Cancelled			Stated above
4.Dummun	Steel Langer	140.0	PCDG	140.2	There is no major change.	
5.Parsua	PCDG	40.0	PCDG	60	There is no major change.	
6.Osmena	PCDG	180.0	PCDG	179.6	There is no major change.	
7.Tipcal	RCDG	38.7	PCDG	40	There is no major change.	
8.Badoc	PCDG	180.0	PCDG	193.1	There is no major change.	
(Package III)						
9.Sta.Cruz I	PCDG	280.0	PCDG	280	There is no major change.	
10.Langlangka I	RCDG	17.4	RCDG	16.6	There is no major change.	
11.Baroro	PCDG	210.0	PCDG	194.95	Additional works related to the elevation of the bridge by 1m	Consideration to the prevention of flood
12.Caba	PCDG	80.0	Only D/D (Detailed design) was conducted.			Stated above
13.San Isidro	PCDG	75.0	Only D/D was conducted.			Stated above
14.Maasim II	PCDG	90.0	Only D/D was conducted.			Stated above
15.Sulipan	Steel Box/ PCBG	369.0	Steel Box/ PCDG	358.7	Additional works related to the change of route of road leading to the bridge and stabilization of soil	

*Note： PCDG－Prestressed Concrete Deck Girder
RCDG – Reinforced Concrete Deck Girder
PCBG – Prestressed Concrete Box Girder

With regard to consulting services, according to the Service Completion Report made by the then management consultant, services such as i) detailed engineering design, ii) technical

assistance to DPWH for the pre-construction activities and iii) construction supervision were conducted as planned[2].
The total M/M of consultants was close to the amount of the initial plan[3] but this does not mean the activities were conducted as originally planned. To be precise, although the scale of outputs was reduced, the stages of bidding preparation and the bidding itself took longer than expected, consuming more M/M of consultants, hence the M/M reduction effect of the reduced scope was offset by the prolonged consulting services.
According to the implementing agencies, both the consultants' and contractors' performance was evaluated as "4" out of a possible 5 grading[4].

In addition, it was confirmed that no damage was caused by Pepeng and Ondoy typhoons to any of the rehabilitated bridges.

3.2.2 Project Inputs

3.2.2.1 Project Period

For this project, the planned schedule was 5 years and 4 months from the L/A (Loan Agreement) signing (September 1999) to the completion of civil engineering work (December 2004). The actual L/A signing was in December 1999 and the whole civil engineering work was finished in March 2007. In other words, the project period was longer than planned: it actually became 7 years and 4 months or 137.5% of the planned period, based on the weighted average of the rates of different work packages with the different construction period.

As shown above, the project period was considerably extended. When analyzed phase by phase, there was little delay in the actual construction period. However, the stages prior to construction, such as bidding preparation and bidding itself took longer than originally expected and, in particular, contract packages II and III were delayed. The procedure of PQ, which examines the appropriateness of bidding enterprises from the past record, also took longer than expected, e.g. 2 months, as compared with the planned 10 days.

3.2.2.2 Project Cost

The originally planned project cost was 3,437 million yen in foreign currency and 842 million pesos in domestic currency (2,526 million yen*), which was 5,963 million yen in total. Among the 5,963 million yen, 5,068 million yen was a yen loan, and the remaining 895 million yen was planned to be shouldered by the Philippine government.
* Exchange rate: 1 peso＝3 yen (as at January, 1999 at appraisal)

The resulting project cost was 964 million yen in foreign currency and 1,412 million pesos in domestic currency (3,114 million yen*), a total of 4,103 million yen, of which 3,786 million yen was a yen loan, and the remaining 317 million yen was shouldered by the Philippine government.
* Exchange rate: 1 peso＝2.20541 yen[5]

The ratio of actual cost to planned cost in terms of yen currency was 68.8%, which was considerably lower than planned. However, in peso terms, the total expense was 1,860 million pesos against the original 1,988 million pesos and the rate of actual cost to planned

[2] In this project it was expected to well establish the construction organization, by appropriately conducting P/Q in every tender. Actually P/Q was conducted on JICA's rule and it is estimated that the selection of consultants and contractors was appropriate from the fact that the implementing agency put high rating for their performances.
[3] (Plan) foreign currency portion: 135 MM and domestic currency portion: 1,578 MM, (Results) foreign currency portion: 141.2 MM and domestic currency portion: 1,604.1 MM
[4] 5: Excellent, 4: Good, 3: Fair, 2: Poor , 1: Very Poor
[5] weighted average during the project period

cost was 93.6%.

In the case of this project, the number of bridges was reduced from the originally planned 15 to 11. Therefore, it is not appropriate to simply compare the planned cost and actual cost and some adjustment is needed. When re-calculated after adjustment, the rate of actual cost to planned cost in terms of yen currency was 110.07% and the same rate in peso terms was 149.73%.
There are 2 major factors of the cost increase in Peso terms. One is the change of design in the Sulipan and Baroro bridges and another is the price increase of construction materials far beyond the original estimate.

With the above in mind, both project period and project cost slightly exceeded the plan, therefore efficiency of the project is fair.

3.3 Effectiveness (Rating: a)

3.3.1 Quantitative Effects

3.3.1.1 Results from Operation and Effect Indicators

The following table shows the change of AADT (Annual Average Daily Traffic) over time. It shows that the traffic volume has increased steadily since the project and the rehabilitation of bridges is considered to have facilitated the easing of traffic.
Average annual growth rates for the period 1997-2009 (target) are set up at 4.5% for each bridge at appraisal. It seems that the actual average rate 2.35% for 2000-2009 is much lower than the planned, when we simply compare the 2 rates. However, the year when the construction was completed is 2007 and the degree of realization of target traffic growth, as the result of the project, should be measured by more recent data. For example, the average traffic growth rate for the period 2006-2009 is 3.2%[6]. Moreover, the forecast rates of traffic growth of other projects which were planned around the same time are about 3%[7]. Then, there is a possibility that the original forecast of 4.5% itself was too ambitious. Accordingly, the effectiveness from the point of view of operation and effect indicators may not be low.

Table 4. Change of AADT

Bridges	Actual (2000)	Actual (2009)	Annual Growth (%)
Sulipan	7,973	9,794	2.31
Aloragat	11,188	14,215	2.70
Baroro	5,891	7,652	2.95
Sta. Cruz	4,831	5,897	2.24
Langlangka	5,688	6,923	2.21
Parsua	4,268	5,208	2.24
Osmenia	2,225	2,710	2.22
Badoc	3,393	4,218	2.45
Tipcal	3,223	3,920	2.20
Dummun	3,564	4,272	2.03
Arcon	4,990	6,150	2.35
average			2.35

Source：DPWH

[6] This is the average rate of 5 bridges for which data is available. (Source: DPWH)
[7] With regard to roads in Pangasinan in Luzon (like this project) in “Rural Road Network Development Project (RRNDP) – Phase 2” which was appraised in 1995, the forecast rates of AADT are between 2.71% and 3%. And with regard to Dalton pass section of Sta Rita – Aritao Road in “Arterial Road Links Development Project (IV)” which was appraised in 1999, the forecast rate of AADT for the period 1981-2007 is 3.25%.

3.3.1.2 Results of Calculations of Internal Rate of Return (IRR)[8]

Although the EIRR (Economic Internal Rate of Return) calculation methods are not exactly the same as the appraisal method, at the ex-post evaluation, similar economic profitability was estimated in the following table.

(Assumptions)

- Cost: Project cost
- Benefits: Reduction of VOC (Vehicle Operation Cost), benefit owing to the increased weight the bridges can withstand, decreased number of impassable days owing to flooding and reduction in maintenance management cost[9]
- Project life: 20 years

Table 5. Comparison of EIRR

Priority rank	Bridges	EIRR at appraisal (%)	EIRR at ex-post evaluation (%)	Comparison*1	Analysis of differences*2
1	Maasim II	46.22	n.a.	n.a.	
2	Sulipan	45.78	19.44	-	Actual AADT (Annual Average Daily Traffic) is only 9,794, while the forecasted AADT during appraisal is 22,945. In addition, actual cost is higher than the expected cost during appraisal. Because of these 2 factors of benefit and construction cost, EIRR became lower.
3	Tipcal	45.34	36.52	-	Actual AADT is only 3,920, while the forecasted AADT during appraisal is 4,050. In addition, actual cost is higher than the expected cost during appraisal because of road extension. Therefore, EIRR became lower.
4	Parsua	27.16	22.56	-	
5	Baroro	27.16	20.91	-	Cost increase lead to the decrease of EIRR.
6	Aloragat	22.94	32.71	+	Actual AADT is 14,215, while the forecasted AADT during appraisal is about 10,000 only. Therefore, EIRR became higher.
7	Caba	22.50	n.a.	n.a.	

[8] The financial internal rate of return (FIRR) shall not be calculated because this project does not generate income without toll fare collection.

[9] In the ex-post evaluation, "benefit owing to the increased weight the bridges can withstand" and "decreased number of impassable days owing to flooding" are not considered, as the detailed record of necessary data of these factors does not remain and we cannot re-calculate them. Generally, "Reduction of VOC" and "reduction in maintenance management cost" are more influential factors.

8	Arcon	21.96	19.47	-	
9	San Isidro	21.80	n.a.	n.a.	
10	Osmena	21.16	15.02	-	As actual AADT is lower than the expected, EIRR became lower.
11	Dummun	20.16	28.14	+	As actual AADT was higher, EIRR was higher.
12	Langlangka I	19.81	31.8	+	This difference cannot be explained by the difference of AADT and construction cost.
13	Pamplona	18.05	n.a.	n.a.	
14	Sta. Cruz I	17.66	18.22	+	
15	Badoc	17.31	19.58	+	
Average		29.29	24.35		

Note:
*1. "+"means EIRR is higher than that at appraisal and "-"means opposite.
*2. Analysis was conducted, when the difference was bigger than 5%.

3.3.2 Qualitative Effects

3.3.2.1 The results of interviews

The summary results of interviews with stakeholders on the direct benefit brought by the project are shown below. (These are the interviews conducted by the Japanese consultant on 3 bridges which he visited.) In summary the effect of transport time reduction and the resulting improvement of flow of goods and improvement of access to various places were confirmed.

Bridge	Interviewees	Comment on effect
Sulipan bridge	District office in charge, DPWH	The time needed to pass the same distance was reduced.
Tipcal bridge	District office in charge, DPWH	The time needed to pass the same distance was reduced.
	Staff of Urban Planning and Development, Currimao city, to which the bridge belongs	Traffic became smoother. Because of the elevation of the bridge position, ships for sightseeing may be able to pass in future. There was no reallocation of residents or land acquisition. There is no environmental issue, either.
	Staff of Urban Planning and Development, neighboring Batac city	The traffic became smoother, because the bridge was widened (there were traffic jams previously). The transport of goods between Ilocos Norte and Manila was improved and the time between the production/harvest of goods/products and sale was reduced. It seems that citizens' access to medical service was also improved.
Badoc bridge	District office in charge, DPWH	The time needed to pass the same distance was reduced.
	Mayor of Badoc city	The bridge was damaged by the typhoon in 2001. He was very satisfied with the project and wanted to express his gratitude to the Japanese government. The bridge was

		widened and the traffic eased. There was no reallocation of residents owing to the project. There was reasonable price determination with regard to the land acquisition and he understands that both sellers of land (citizens) and buyer (DPWH) received benefit.

The consultant also conducted interviews with stakeholders in Laoag city, in northern Luzon and the results are shown as follows:

1. Bus companies and car rental companies (4 companies): All the companies enjoy the benefit of the reduction of transport time. For example, it took at least 10 hours to move from Laoag to Manila before but it takes only around 8 hours now. They do not feel any particular negative impact from the project.
2. Companies and shops along the arterial road including the rehabilitated bridges (7 companies/shops): 6 out of 7 companies/shops replied that they enjoyed the benefit of the project (reduction of transport time). 2 companies even mentioned their sales had increased. No one felt a negative impact from the project.

3.3.2.2 The results of beneficiary survey

The results of a beneficiary survey conducted near 11 rehabilitated bridges were as follows. The effect of transport time reduction and the resulting improvement of flow of goods and improvement of access to various places were confirmed here as well.

The total number of resident respondents was 214, who were residents living at the roadsides or in the neighborhoods of the bridges rehabilitated in this project. The respondents were a virtually equal split of males and females, and their main occupations were employers (storekeepers and so on), drivers, those with no regular job/housewives, farmers and blue-collar workers. Over 70% of them use the bridges daily.

The following are the responses concerning the direct benefits of this project:

- This project has brought an increase in the shipping volume of goods (mainly crops). 71 repliers, more than 30% of the total, agreed on this.
- The smoother traffic realized by this project contributed to the distribution of goods to and from further destinations. In both aspects about 10% of repliers agreed.
- Reduced travel time was realized. 138 people, more than 60% of the total, agreed. In addition, 31 people replied that the previous 1 hour travel had been shortened by 15 minutes or more.
- Improved access was demonstrated by the following rates:

Destination	Rate of respondents who said access was improved (%)
Markets and stores	69.2
Social services (schools and so on)	45.3
Hospitals	52.8
Government offices	28.0
NGO offices	8.4
Others	2.8

The total number of passengers responding was 29, of whom the main occupations were drivers, business persons, employers (e.g. storekeepers) and so on. Over 60% of them use the bridges daily.

The following are responses concerning the direct benefits of this project:

- This project has brought an increased shipping volume of goods (mainly crops). 17 people, about 60% of the total, agreed on this.
- The smoother traffic realized by this project facilitated the distribution of goods to and from further destinations. About 30% of repliers agreed on the facilitation of the distribution of goods to further destinations, while 20% agreed on the facilitation of the distribution of goods from further destinations.
- Reduced travel time was realized. 25 people, more than 80% of the total, agreed. In addition, 7 people replied that the previous 1 hour travel had been shortened by 15 minutes or more.
- Improved access was reflected in the following rates:

Destination	Rate of respondents who said access was improved (%)
Markets and stores	69.0
Social services (schools and so on)	51.7
Hospitals	48.3
Government offices	34.5
NGO offices	3.4
Others	6.9

With the above in mind, this project has largely achieved its objectives, therefore its effectiveness is high.

3.4 Impact

3.4.1 Intended Impacts

① The results of the abovementioned beneficiary survey

The existence of a certain number of residents who stated an increase of employment opportunities and/or income was confirmed. Nearly 80% of interviewees replied with either "Excellent" (5) or "Good" (4) with 40% of interviewees replying "Excellent", with regard to the project benefit.(5 grade evaluation)

In addition, the effect of the transport time reduction and the increased shipping volume of agricultural products, which are confirmed in the item of "effectiveness", seem to have had a certain positive impact on industries, transport companies, farmers and other citizens in terms of income. (See the benefit related comments by bus/rent-a-car companies and enterprises /shops along the arterial roads including the project bridges, shown in the above item of 3.3 effectiveness.)

Furthermore, the positive impact on the environment given by the project was also confirmed and there was almost no influence on private properties and houses.

The following were the concrete responses by 214 interviewed residents concerning the impact of this project:

1. Job opportunity: Did you get any new job opportunities after this project? Yes (15.4%), No (68.7%), No answer (15.9%)
2. Change in income: Did your household income increase after this project? Yes (38.8%), No (38.3%), No answer (22.9%)
3. Change in the number of traffic accidents: Increased (38.8%), decreased (51.4%), Unknown (9.8%)
4. Impact on properties and houses: There is an impact (1.9%)

5. Change in environment after construction

(only the main items extracted, response rate: %)

Item	Deterioration	No change	Improvement
Air	4.7	38.8	56.5
Noise	6.1	40.7	53.3
Water quality	0.5	80.8	18.7

6. Comprehensive evaluation of project benefits

Item	Share of respondents (%)
Excellent	37.4
Good	41.1
Neutral	15.4
Slightly Negative	0.9
Very Negative	1.4
No answer	3.7

The concrete responses by 29 passengers concerning the impact of this project were as follows:

1. Change in the number of traffic accidents: Increased (20.7%), decreased (69.0%), Unknown (10.3%)
2. Comprehensive evaluation of project benefits

Item	Share of respondents (%)
Excellent	17.2
Good	55.2
Neutral	17.2
Slightly Negative	3.4
Very Negative	0
No Answer	6.9

② Economic indicators: Agricultural production

The changes in the outputs of "rice and corn" in 7 provinces, including the 11 rehabilitated bridges, were as follows: (The completion dates of packages 1, 2 and 3 are respectively, November 2002, March 2006 and March 2007.) In considering the results of the beneficiary survey, it is estimated that this project may have contributed to the increase of agricultural production by improving the transport of agricultural products.

The deterioration of indicators in 2009 seems to be caused by the typhoons. The number of typhoons which attacked this region since the year 2005 (annual base) is "1, 3, 1, 1, 6"[10] and the figure of 2009 (6) is outstanding.

[10] Information of Philippine Atmospheric Geophysical and Astronomical Services

Table 5. Indicators on agricultural production in project areas

Item	2005	2006	2007	2008	2009
Rice (thousand tons)	3,257	3,608	3,772	3,862	3,451
Annual growth rate (%)	1.05	10.77	4.54	2.37	-10.64
Corn (thousand tons)	1,008	1,438	1,549	1,724	1,789
Annual growth rate (%)	-22.71	42.62	7.74	11.32	3.77

Source: Bureau of Agricultural Statistics website (www.bas.gov.ph)

3.4.2 Other impacts

Negative influence on natural environment is not observed. No particular problems occurred concerning relocation of residents or land acquisition. There is no particular problem as a whole.

(1) Impacts on the natural environment: The issuance of an Environmental Compliance Certificate (ECC) was a prerequisite of the construction in the project and the ECC was issued as planned.

Also in interviewing the executing agency (DPWH, District Offices) with an environment checklist (the same as that used during the appraisal) for 3 rehabilitated bridges, no particular problem was seen. In addition, based on the results of the abovementioned beneficiary survey, in terms of air pollution and noise, many stated that the situation was improved after the project (56.5% of the total answered that the air quality had improved, and 53.3% stated a noise reduction).

(2) Land Acquisition and Resettlement: Although a questionnaire including this issue was sent to all the DPWH Regional Offices in charge of the rehabilitated bridges, very little information was provided. According to the financial report of the project, however, the actual expenditure of the land acquisition was approximately 13 million Pesos, while the planned amount was approximately 18.5 million Pesos. In addition, in the abovementioned beneficiary survey, although it was a sample survey, there was no reply of a complaint concerning resettlement and land acquisition.

According to the interview with the stakeholders at 2 places also, it was confirmed that there was no resettlement of residents and the compensation price for the land was formulated rationally with regard to the land acquisition at Badoc bridge without any trouble.

(3) Unintended Positive/Negative Impact: Likewise in the results of the beneficiary questionnaire survey, very little negative impact was mentioned.

According to the results of beneficiary survey of residents living near the bridges, the result of interview to various government staff and economic data of the regions including the project sites, the expected impact of the project such as the economic development of the Luzon island is estimated to be realized to a certain degree. Negative impact on natural environment and others is not observed.

3.5 Sustainability (Rating: b)

3.5.1 Structural Aspects of Operation and Maintenance

The actual maintenance operation was supposed to be conducted by the District Office under the supervision of the Regional Office either directly or by the use of the service contract[11]. However, with regard to 5 project bridges including 3 bridges surveyed by us, the managerial responsibility has not been transferred from the central PMO (Project Management Office) to the Regional or District Offices. Although there is no particularly serious problem of bridge condition at moment, unclear O&M responsibility may lead to the future shortage of O&M budget or loose O&M management. More than 3 years have elapsed since the completion of rehabilitation (January, 2007) and the earliest possible transfer of such responsibility is needed.

3.5.2 Technical Aspects of Operation and Maintenance

The expected operation and maintenance are as follows:

- Patching of holes along the carriageway and asphalt overlay along the approaches
- Painting of bridges to prevent rusting

In addition, immediate measure will be taken in an emergency such erosion caused by flood.

According to an interview survey and questionnaire response, the number of staff is sufficient and there seems to be no particular problem in terms of the technological levels of the staff. Training of staff is undertaken by dispatching staff to training organized by DPWH Regional Offices. The maintenance method is fairly standardized in DPWH and the following manuals are used in District Offices:

- Road Repair and Maintenance Manual, June 1991 (DPWH)
- Road Construction Manual (DPWH)
- Bridge Inspector's Handbook (DPWH) , originally from "Overseas Unit, Transport and Road research Laboratory, Crowthorne Berkshire, U.K."

With the above in mind, it is fair to say that there is no problem in terms of the operation and maintenance technology.

3.5.3 Financial Aspects of Operation and Maintenance

The road maintenance budget amounts of the entire DPWH in recent years were as follows: Every year a certain maintenance budget is secured.

Table 6. The road maintenance budget of the entire DPWH Unit: million pesos

Year	Routine/Carriageway maintenance	Roadside maintenance	Preventive maintenance	Total length of national roads (km)
2007*1	2,021	1,750	7,300	29,968
2008*2	4,021	1,850	6,690	30,224
2009	3,500	2,020	7,300	30,594

Source: Bureau of Maintenance, DPWH

*1. In 2007, 720 million Pesos of so-called "Special Road Safety Fund" were also allocated.

*2. In 2008, 663 million Pesos of "Road Safety Projects" were also allocated.

With regard to the sufficiency of the O&M budget for the project bridges, 5 out of 9 DPWH District Offices, which were either interviewed or replied to the questionnaire, mentioned that the O&M budget for roads including the project roads was not sufficient. However, when we examine the trend of the O&M budget for all the offices in charge of rehabilitated bridges, there is no overall declining trend.

[11] According to the appraisal document

3.5.4 Current Status of Operation and Maintenance

As stated above, with regard to almost half the rehabilitated bridges, the management responsibility of O&M was not officially transferred to DPWH Regional Offices or District Offices from the central office. However, a District Office, which will be in charge of Sulipan bridge, already conducts O&M activities such as patching of holes along the carriageway and asphalt overlay along the approaches under the supervision of the Regional Office.

The situation of the 4 bridges which the evaluation consultant visited is summarized as follows:

Sulipan: There is a small problem in the expansion joints (melted and deformed asphalt) but not serious.

Tipcal: In good condition.

Badoc: There is a small problem in the expansion joints (melted and deformed asphalt) but not serious.

Aroragat: In good condition.

According to the researchers involved in the beneficiary survey, who actually visited all the 11 bridges, the condition is good in general but there was a need to install lights at some bridges from the point of view of safety.

Likewise, in the beneficiary survey, 58 of 243 interviewees requested the installation or addition of lights. In particular, for Sulipan and Tipcal, nearly half the interviewees requested lights.

Having mentioned the above issues, 199 interviewees, 93% of the total, were satisfied with the condition of O&M of the rehabilitated bridges.

Although there is no serious problem with the facilities themselves, the management responsibility of O&M should be promptly transferred to the DPWH Regional Offices or District Offices, as mentioned above.

With the above in mind, some problems have been observed in terms of organization; therefore sustainability of the project is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The relevance of this project is high because the project is highly consistent with the following three matters: the development policy of the Philippines at the time of both the appraisal and the ex-post evaluation; development needs; and Japan's aid policy. Both project period and project cost slightly exceeded the plan[12], therefore efficiency of the project is fair. The effectiveness as seen in the operation and effect indicators and the internal rates of return is high and an impact was also created. Some problems have been observed in terms of organization; therefore sustainability of the project is fair.

In light of the above, this project is evaluated to be satisfactory (B).

4.2 Recommendations

4.2.1 Recommendation to the executing agency

- Management responsibility is usually transferred from the central PMO to the Regional/District Offices of DPWH 1 year after the project completion. However, with regard to the 5 bridges, the management responsibility was not yet officially transferred.

[12] The project scope was reduced and accordingly, the necessary project period and cost were recalculated for the purpose of an appropriate evaluation.

Accordingly, it is urgently necessary to transfer the management responsibility.

- In the beneficiary survey a considerable number of interviewees requested either the installation or addition of lights to prevent traffic accidents and such requests should be seriously discussed based on the traffic volume particularly at night.

4.2.2 Recommendation to JICA

None in particular.

4.3 Lessons Learned

None in particular.

Comparisons of the Planned and Actual Figures

Components	Plan		Actual	
①Outputs				
Bridges	Method*	Length(m)	Method*	Length(m)
(Package I)				
1.Aloragat	PCDG	210.0	PCDG	210.6
(Package II)				
2.Arcon	PCBG	150.0	PCDG	140
3.Pamplona	PCBG	490.0	cancelled	
4.Dummun	Steel Langer	140.0	PCDG	140.2
5.Parsua	PCDG	40.0	PCDG	60
6.Osmena	PCDG	180.0	PCDG	179.6
7.Tipcal	RCDG	38.7	PCDG	40
8.Badoc	PCDG	180.0	PCDG	193.1
(Package III)				
9.Sta.Cruz I	PCDG	280.0	PCDG	280
10.Langlangka I	RCDG	17.4	RCDG	16.6
11.Baroro	PCDG	210.0	PCDG	194.95
12.Caba	PCDG	80.0	Only detailed design was conducted.	
13.San Isidro	PCDG	75.0	Only detailed design was conducted.	
14.Maasim II	PCDG	90.0	Only detailed design was conducted.	
15.Sulipan	Steel Box/ PCBG	369.0	Steel Box/ PCDG	358.7
②Term	September, 1999～ December, 2004 (64 months)		December, 1999～ March, 2007 (88 months)	
③Project costs Foreign currency Local currency Total ODA Loan Portion Exchange Rate	3,437 million Yen 842 million Peso (2,526 million Yen) 5,963 million Yen 5,068 million Yen 1 Peso ＝ 3 Yen (As at January, 1999)		964 million Yen 1,412 million Peso (3,114 million Yen) 4,103 million Yen 3,786 million Yen 1 Peso ＝ 2.20541Yen (Weighted average)	

*Note: PCDG－Prestressed Concrete Deck Girder
RCDG – Reinforced Concrete Deck Girder
PCBG – Prestressed Concrete Box Girder

Third Party Opinion
Rehabilitation and Maintenance of Bridges Project (Phase IV)

Josef T. Yap, Philippine Institute for Development Studies

The evaluation process adopts a straightforward methodology and judging from other projects, the methodology is applied consistently. The criteria and ranking are well defined.

When evaluating cost effectiveness, the exchange rate is allowed to vary. Hence the comparison of the budget at the start of the project and the actual cost in yen terms becomes misleading. The main reason is that the actual costs are in peso terms. The project evaluator argues that this is a rule that JICA has set. Nevertheless, as shown in the report comparing yen costs and local currency costs will generate different outcomes about cost efficiency.

The provinces where the bridges are located are as follows:

	Bridge Name	Province	Road Name
1	SULIPAN	Pampanga	Manila North Rd
2	ALORAGAT	Pangasinan	Manila North Rd
3	BARORO	La Union	Manila North Rd
4	STA CRUZ	Ilocos Sur	Manila North Rd
5	LANGLANGKA	Ilocos Sur	Manila North Rd
6	PARSUA	Ilocos Sur	Manila North Rd
7	OSMENA	Ilocos Sur	Manila North Rd
8	BADOC	Ilocos Norte	Manila North Rd
9	TIPCAL	Ilocos Norte	Manila North Rd
10	DUMMUN	Cagayan	Cagayan Valley Rd
11	ARCON	Isabela	Daang Maharlika

These are provinces located mainly in Region 1 and 2. Poverty incidence in Region 1 is almost equal to that of the national average.[13] Hence there is not much controversy in geographic location of the projects. Ilocos Sur, La Union, and Pangasinan experienced sharp reductions in poverty incidence between 2000 and 2003. While there was a deterioration in the poverty situation between 2003 and 2006, there was a net improvement between 2000 and 2006. The projects, therefore, contributed positively to poverty reduction in Ilocos Sur, La Union, and Pangasinan. Ilocos Norte, Cagayan, and Pampanga are provinces where poverty is less of a problem.

The evaluation of effectiveness of the project was done systematically and in a robust manner.

[13] Data on poverty incidence per province can be obtained from http://www.nscb.gov.ph/poverty/2006_05mar08/table_1.asp