Ex-Post Project Evaluation 2013: Package III-8

(Tajikistan, Mongolia, Samoa)

November 2013

JAPAN INTERNATIONAL COOPERATION AGENCY

Ernst & Young Sustainability Co., Ltd.

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Preface

Ex-post evaluation of ODA projects has been in place since 1975 and since then the coverage of evaluation has expanded. Japan's ODA charter revised in 2003 shows Japan's commitment to ODA evaluation, clearly stating under the section "Enhancement of Evaluation" that in order to measure, analyze and objectively evaluate the outcome of ODA, third-party evaluations conducted by experts will be enhanced.

This volume shows the results of the ex-post evaluation of ODA Loan projects that were mainly completed in fiscal year 2010, and Technical Cooperation projects and Grant Aid projects, most of which project cost exceeds 1 billion JPY, that were mainly completed in fiscal year 2009. The ex-post evaluation was entrusted to external evaluators to ensure objective analysis of the projects' effects and to draw lessons and recommendations to be utilized in similar projects.

The lessons and recommendations drawn from these evaluations will be shared with JICA's stakeholders in order to improve the quality of ODA projects.

Lastly, deep appreciation is given to those who have cooperated and supported the creation of this volume of evaluations.

November 2013

Toshitsugu Uesawa
Vice President
Japan International Cooperation Agency (JICA)

Disclaimer

This volume of evaluations, the English translation of the original Japanese version, shows the result of objective ex-post evaluations made by external evaluators. The views and recommendations herein do not necessarily reflect the official views and opinions of JICA. JICA is not responsible for the accuracy of English translation, and the Japanese version shall prevail in the event of any inconsistency with the English version.

Minor amendments may be made when the contents of this volume is posted on JICA's website.

JICA's comments may be added at the end of each report when the views held by the operations departments do not match those of the external evaluator.

Tajikistan

Ex-Post Evaluation of Japanese Grant Aid Project
"The Project for Improvement of Dusty – Nijiny Pyandzh Road"

External Evaluator: Keisuke Nishikawa
Ernst & Young Sustainability Co., Ltd.

0. Summary

This project, in which major arterial roads were rehabilitated to ensure safe and stable traffic and transportation in the south-western part of the landlocked country of Tajikistan, was consistent with the development plan and needs of the country both during planning and ex-post evaluation. It was also relevant with the ODA policy of Japan during the planning stage. The effectiveness and impact of the project was high as this project achieved considerable reductions in travel time and flooding on the international highway. It also underpinned increased traffic and freight volumes and contributed to the improvement of access to a market and major cities. However, the efficiency of the project was low due to the excesses in project cost and periods compared to the plan, as the prices of construction materials escalated and more time was spent on countermeasures to the changes in procurement conditions. Also, some sections of the road began showing damage soon after the completion and some of the road surfaces still needed to be improved even during the ex-post evaluation. While the major causes are assumed to be an increased traffic volume and the passage of overloaded vehicles after project completion, shortages of budget and repair equipment of the executing agency have also resulted in insufficient repair works on the damaged sections. On the other hand, installations of vehicle weighing equipment and an establishment of management structure to crack down on overloaded transport vehicles were being explored. Also, concrete initiatives were taken for the appropriate procurement of maintenance equipment and materials, as well as for capacity building of the engineers concerned. Therefore, the sustainability of the project can be judged to be fair.

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

1. Project Description

Project Location

International highway developed in the project

1.1 Background

In Tajikistan, where more than 90% of the area is mountainous, regional highways connecting Tajikistan's major cities and neighbouring countries are one of the most important infrastructure facilities. Nevertheless, most of these arterial roads were built during the times of the former Soviet Union and had been left damaged for a long time, becoming a bottleneck to the growth of national economy heavily dependent on road networks for logistics and trade with its neighbouring countries. Under these circumstances, Tajikistan, with a view to developing infrastructural facilities in a systematic manner, prepared the 'Programme of Socio-Economic Development of the Transport Complex of the Republic of Tajikistan' every five years since independence, and preferentially promoted the development of major roads.

The target road of this project was planned to form part of the major arterial road connecting Tajik and Afghan capitals. This route was not only listed as the priority road in the 'Programme of Socio-Economic Development of the Transport Complex of the Republic of Tajikistan 2001 – 2005' but was also regarded as a section of the Asian Highway network. However, the project road had been damaged and left as they were since the times of the former Soviet Union. Despite routine maintenance activities within budget constraints, neither thorough rehabilitation nor reconstruction of this road section had been implemented due to a lack of equipment. It was considered necessary to repair the roads urgently to secure the functions of the regional highway[1] after the opening of

[1] Of the entire highway section from the capital city of Dushanbe to the Afghan border point, a road section between Dushanbe and Kurgan Tyube was rehabilitated by the Asian Development Bank (ADB). For the Kurgan Tyube – Dusty section, a subsequent grant aid project 'The Project for Rehabilitation of Kurgan Tyube - Dusti Road' is currently implemented. This project was implemented, with the request of Tajikistan, to rehabilitate a 23.7km section from Dusty to Nijiny Pyandzh, located at the border with Afghanistan.

the international border bridge[2] between Tajikistan and Afghanistan.

In light of the above, this project was implemented as a grant aid project.

1.2 Project Outline

The objective of this project was to ensure safe and stable traffic and transportation and to strengthen the functions as a regional highway by improving the national road between Dusty and Nijiny Pyandzh and two road sections in Dusty Township.

Grant Limit / Actual Grant Amount	Phase I: 595 million yen / 580 million yen Phase II: 1,324 million yen / 1,261 million yen (Initial Grant Limit for Phase II: 737 million yen)
Exchange of Notes Date / Grant Agreement Date	Phase I: September, 2006 / No Grant Agreement signed[3] Phase II: January, 2009 / January, 2009 (Initial Exchange of Notes Date for Phase II: July, 2007)
Executing Agency	Ministry of Transport and Communication (currently the Ministry of Transport: MOT)
Project Completion Date	Phase I: June, 2008 Phase II: November, 2010
Main Contractor	Phase I: Nishimatsu Construction Co., Ltd. Phase II: NIPPO Corporation
Main Consultant	Katahira & Engineers International
Basic Design	June, 2006
Related Projects	[JICA] Technical Cooperation Road Administration Advisor (2008 – 2014), The Project for Improvement of Road Maintenance (2013 –) Grant Aid The Project for Rehabilitation of Kurgan Tyube - Dusti Road (2008 – 2013), The Project for Improvement of Equipment for Road Maintenance in Khatlon Region and Districts of Republican Subordination (2013 –) [Other Donors] Asian Development Bank (Loan) Rehabilitation of 88km road sections between Dushanbe, Kurgan Tyube, Dangara and Kulyab (2001 – 2005)

[2] A bridge over Pyandzh River, running along the border between Tajikistan and Afghanistan. Its construction was supported by the United States of America and Norway to ensure stable logistics between these two countries.

[3] No Grant Agreement was signed as the Ministry of Foreign Affairs was in charge of the supervision of the implementation of grant aid projects at that time.

	United States of America and Norway (Grant) Construction of a Cross-Border Bridge on the border with Afghanistan (2005 – 2007)

2. Outline of the Evaluation Study

2.1 External Evaluator

Keisuke Nishikawa (Ernst & Young Sustainability Co., Ltd.)[4]

2.2 Duration of Evaluation Study

This ex-post evaluation study was conducted with the following schedule.

Duration of the Study: November 2012 – November 2013

Duration of the Field Study: March 24 – April 9, 2013

3. Results of the Evaluation (Overall Rating: C[5])

3.1 Relevance (Rating:③[6])

3.1.1 Relevance with the Development Plan of Tajikistan

In Tajikistan, road investment for an improvement of transport linkages was listed in the 'National Development Strategy', formulated in August 2006, as one of the major activities conducive to economic growth. The target road section in this project comprised part of a major international highway that connected Dushanbe, capital of Tajikistan, and Kabul, capital of Afghanistan. This road was listed in the National Development Strategy as a road to be improved, and was also positioned as a regional highway in the Asian Highway Network initiative led by the United Nations. It was also a priority road in Tajikistan's 'Long-term Transportation Development Plan 2001 – 2005' and the need and urgency of road development was also emphasised in the Ministry of Transport's 'Programme of National Investment and Technology for 2005 – 2007'.

In late 2011, the 'National Target Development Strategy for the Transport Sector to the Year 2025' was formulated, in which an expansion of road networks was the focus, in light of significant traffic on major national roads. During the ex-post evaluation, the development of major highways remained consistent[7] with the UN's Asian Highway initiative, and was also promoted as part of a Central Asia Regional Economic

[4] Joined the evaluation team of Ernst & Young Sustainability as a team member from Japan Economic Research Institute Inc.

[5] A: Highly satisfactory, B: High, C: Partially satisfactory, D: Unsatisfactory

[6] ③: High, ②: Fair, ①: Low

[7] Rehabilitation works of the Asian Highways (AH) in Tajikistan (AH7, AH65 and AH66) are currently being implemented, mainly with assistance from Japan, ADB, and China, leading to better domestic and international connectivity.

Cooperation (CAREC) programme, with cooperation from the Asian Development Bank (ADB), European Bank for Reconstruction and Development (EBRD), and World Bank (WB), etc.[8]

Based on the above, the importance of the project road has been consistently high from the planning period to ex-post evaluation, and this project can be considered highly relevant to the policy and the sector plan. In Central Asia, the importance of regional economic cooperation through better connectivity between countries is also being promoted by the CAREC programme in addition to the Asian Highway initiative. Therefore, this project is considered to be significant from not only Tajik but also regional perspectives.

3.1.2 Relevance with the Development Needs of Tajikistan

When this project was being planned, some difficulties were seen in Tajikistan in transporting basic daily commodities and trading with neighbouring countries due to the deterioration of major roads constructed during the former Soviet era. Regarding daily maintenance activities, small damages such as potholes were repaired even under budget constraints. However, despite increasing deterioration, comprehensive rehabilitation work such as overlaying were neither implemented nor planned due to a lack of equipment. Urgent rehabilitation of the road section to be covered under this project was also required to ensure its functions as a regional highway, particularly after a border bridge with Afghanistan was scheduled to be completed in 2007.

It became clear during the ex-post evaluation that the number of registered vehicles in Tajikistan was 297,272[9] in 2010, substantially up from the 111,588 recorded in 2000. During the same period, domestic and international freight transportation volumes also increased (see 'Effectiveness' for details), backed by the growth of construction and manufacturing sectors, with much of the materials and goods being transported on roads. However, as stated in the National Target Development Strategy for the Transport Sector, while the demand for road was rising, a road density was still much lower than that in developed countries and paved road was lacking, becoming a serious socioeconomic issue.

Thus, the project road was a major highway connecting Tajikistan with Afghanistan and other neighbouring countries, playing an important role in meeting the increasing traffic volume. The need for freight transport continues to be high as seen in the

[8] CAREC has four priority areas in transport, trade facilitation, energy, and trade policy. In the transportation area, six regional highways are to be developed. The project road corresponds to Corridor 5 and Corridor 6.

[9] 80% were passenger cars, 14% for trucks, and buses accounted for 6% of the total vehicles.

particularly high proportion of truck transport. The number of registered vehicles continues to increase, and road development has had an essential position in terms of regional development.

3.1.3 Relevance with Japan's ODA Policy

At the time of project planning, Japan had prioritised its ODA to focus on human security, the institutional development of market economy, economic development, and the promotion of regional cooperation in Central Asia, where road development was listed as one of the concrete measures. During the second foreign minister meeting of the Central Asia plus Japan Dialogue, held in June 2006, the implementation of this project was specified in the Action Plan to promote intra-regional cooperation among the Central Asian countries.

In this way, this project was seen as a project valuable in promoting regional cooperation in Central Asia, as well as nation-building based on sustainable development and market economy; therefore, the project was highly consistent with Japan's ODA policy.

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

3.2 Effectiveness[10] (Rating:③)

3.2.1 Quantitative Effects

3.2.1.1 Reduction in Travel Time

An approximately 23.7km road section between Dusty and Nijiny Pyandzh was scheduled to be rehabilitated in this project, out of which a 12.1km residential section between 0+000km and 12+100km points and the remaining desert section of 11.6km between 12+100km and 23+700km points were both expected to shorten the travel time.

Base values prior to project implementation, target values upon project completion, and actual values recorded in the ex-post evaluation study are shown in the table below for comparison.

[10] Sub-rating for Effectiveness is to be put with consideration of Impact.

Table 1: Reduction in Travel Time

	Base value (2006)	Target value upon completion (Target year: 2008)	Ex-post evaluation (2013)	
			Measured value	Value answered by the Executing Agency
Travel time in the residential section (12.1km)	29 minutes (Approx. 25km/h)	18 minutes (Approx. 40km/h)	14 minutes (Approx. 52km/h)	14 minutes (Approx. 52km/h)
Travel time in the desert section (11.6km)	20 minutes (Approx. 35km/h)	12 minutes (Approx. 60km/h)	12 minutes (Approx. 60km/h)	12 minutes (Approx. 60km/h)
Travel time of the entire section	49 minutes	30 minutes	26 minutes	26 minutes

Source: Basic Design Report, Answers to the Questionnaire by the Executing Agency, Actual site survey by the evaluation team

Travel time for the project road section was 49 minutes in total at the time of planning; 29 minutes for the first 12.1km section, and another 20 minutes for the remaining section. It was reduced to a total of 26 minutes (14 minutes and 12 minutes, respectively) based on the time measured during the ex-post evaluation study. The total travel time had been expected to be shortened to 30 minutes after project completion, but it was actually reduced further. A major factor in the travel time becoming much shorter than the target was the realisation of an average speed of 52km/h, as the first 12.1km section had two sub-sections where the speed limit was 40km/h and 60km/h. Also, the average travel time obtained in a beneficiary survey[11] was 28 minutes after project implementation, which is less than half of the 58 minutes answered as the time required before the project, thereby being mostly consistent with the measured value and the value answered by the Executing Agency.

Based on the above, this project has enabled vehicles to travel at upper speed limits throughout the project road section, achieving the target of travel time decreased to 30 minutes.

3.2.1.2 Fewer Flooding Days

Along the project road, there was a six-kilometre section with irrigation canals, where leakages and spill-over flows were causing road flooding approximately 40 days a year (an average of five hours a day), becoming a contributing factor to road damages. While the repairs of canals were outside of the project scope, some parts of this section were levelled higher and ditches were placed on the roadside to reduce the incidence of flooding.

Although no data on flooding days and duration were available, the

[11] An interview survey with 100 residents in Dusty and Nijiny Pyandzh was conducted. The main questions concerned travel time, traffic flow, road safety, flooding, satisfaction with road conditions, environmental and social impacts, maintenance conditions, etc.

flood-preventing measures taken in this project substantially reduced the incidence of flooding to one or two days a year, according to the Executing Agency. In the beneficiary survey, 90% of the respondents felt reductions in flooding, showing an improvement. As a consequence, smooth traffic is always possible without canal water covering the road during irrigation season.

Table 2: Changes in Road Flooding

	Base value (2006)	Target value at project completion (Target year: 2008)	Ex-post evaluation (2013)	
			Beneficiary survey results	Response from the Executing Agency
Reduction in the number of days and duration of time for road flooding	Approx. 40 days a year (5 hours a day, when vehicles cannot pass)	Reduced	More than 90% replied 'Reduced'	One to two days a year

Source: Basic Design Report, Answers to the Questionnaire by the Executing Agency, Beneficiary Survey Results

3.2.1.3 Traffic and Freight Volumes

In the ex-post evaluation survey, data on basic quantitative indicators such as traffic and freight volumes were collected, in addition to the above indicators expected at the time of planning.

Photo 1: Trucks waiting for clearance at the Cross-Border Bridge (Near the end point in Nijiny Pyandzh)

Annual traffic volumes on the project road (around the end point on the Nijiny Pyandzh side) became four times larger than that of the planning period in 2006. Table 3 shows that the traffic volume recorded a big surge particularly in 2011, soon after the completion of this project; increases were recorded for all passenger cars, buses and trucks. In terms of the number of vehicles, trucks account for 73% of the total, implying that this road is functioning as an arterial road supporting the distribution of goods to and from Afghanistan in particular.

Table 3: Annual Traffic Volume on the Project Road

(Unit: Number of vehicle)

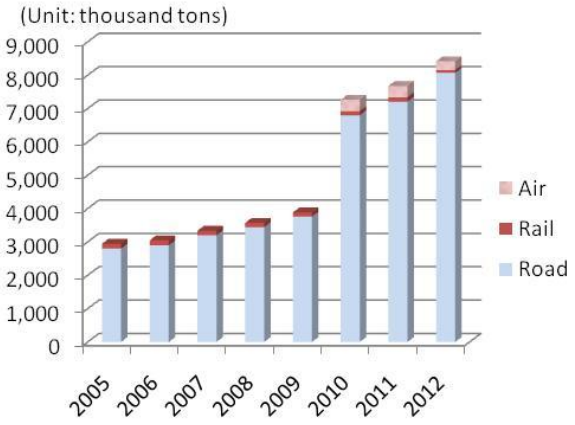
	2005	2006	2007	2008	2009	2010	2011	2012
Passenger car	2,165	2,625	3,003	3,570	4,466	5,609	9,030	10,673
Bus	201	245	284	337	421	526	847	1,001
Truck	6,514	7,895	9,032	10,750	13,458	16,921	27,342	32,320
Total	8,880	10,765	12,319	14,657	18,345	23,056	37,219	43,994

Surveyed at the end point in Nijiny Pyandzh

* Estimated value based on the actual values of 24-hour traffic counted several times. One-way traffic data

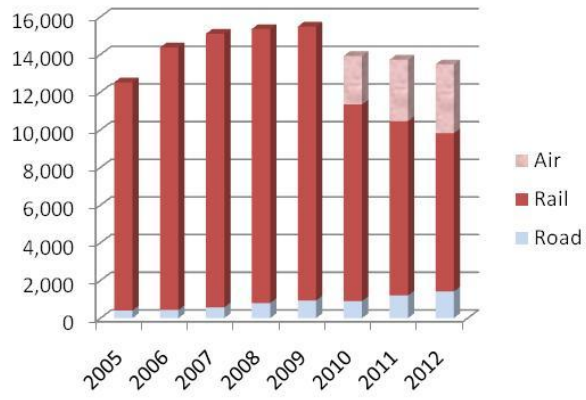
Source: Data provided by the Executing Agency

With respect to freight transportation, no data specific to the project road was available. However, national data for domestic and international freight volumes by transportation mode indicates, as shown in the figures below, that the proportion of domestic and international transport via road has been gradually increasing.



Note: No 'Air' data prior to 2010 available.
Source: Data provided by the Executing Agency

Figure 1: Freight Volume by Traffic Mode (Domestic)



Note: No 'Air' data prior to 2010 available.
Source: Data provided by the Executing Agency

Figure 2: Freight Volume by Traffic Mode (International)

3.2.2 Qualitative Effects

As a qualitative effect of this project, it was expected that as a regional highway, road widths would be expanded, enabling the roads to respond to increases in traffic volume, thereby making traffic safer and smoother. These effects were checked mainly during the site visit and by implementing a beneficiary survey.

All the respondents in the beneficiary survey felt substantial improvements in road surfaces as they could now travel smoothly. In terms of safety, 99% of them replied that the road became safer, 76% of whom also cited the removal of potholes and cracks on the road surface as the main reason. Rehabilitated road sections had standards

functional as a regional highway, with sufficient widths for large trucks to travel within specified speed limits without any problems. 13% of the respondents also commented that the road became safer as this project had expanded the effective width of the road. Despite these positive views, however, 9% of them expressed some concerns on the significantly increased speed of vehicles due to the sufficient road widths secured in the project.

As described above, it was observed that beneficiaries generally highly regarded the safety and smoothness of the road.

3.3 Impact

3.3.1 Intended Impacts

It became clear during the ex-post evaluation survey that the project road had played an important role as an arterial road to provide goods to Afghanistan and was functioning in recent years as a route for building materials to be transported from Afghanistan. The cross-border bridge between Tajikistan and Afghanistan constructed with assistance from the United States, etc., as well as the road section covered under this project has produced some effects by facilitating the smooth flow of trucks. According to the MOT's vehicle weight inspection station in Nijiny Pyandzh, an average of 60 large trailers (one-way) pass through the station every day.[12]

Photo 2: Traffic around the Dusty Market (along the project road)

After completion of this project, a subsequent grant aid project 'The Project for Rehabilitation of Kurgan Tyube – Dusti Road' was implemented beginning in 2008. Once completed, Nijiny Pyandzh will be connected to Kurgan Tyube, a major city in Khatlon Province, with a high-standard road. As a section between Kurgan Tyube and Dushanbe was rehabilitated in the mid-2000s with assistance from ADB, it is hoped that access between the Afghan border areas and the capital will be immensely improved. Travel time between Kurgan Tyube and Nijiny Pyandzh was previously approximately three hours, but it was reduced to 1.5 hours or so, as measured during the site visit, although some sections were still being worked on.

Accessibility has also improved within the project area, making trips substantially

[12] A MOT inspection station near the end point in Nijiny Pyandzh checks the weight of all trucks heading for destinations in Tajikistan.

easier. A town in the centre of the project area is Dusty, where a market is located along a section of the project road. The implementation of this project enabled better access from Nojiny Pyandzh to the Dusty Market, and a subsequent project has also improved access from an area north of Dusty. While no particular induced economic effects have emerged as a consequence, many comments were heard in the beneficiary survey in Nijiny Pyandzh and settlements along the project road that access to the Dusty market had improved considerably.

3.3.2 Other Impacts

3.3.2.1 Impacts on the Natural Environment

During the project planning, dust generated by vehicle passage was expected to decrease as a result of the rehabilitation of roads and road shoulders. No deforestation was planned as this project included only the rehabilitation of existing roads. Therefore, the project would not cause any impacts on the habitat conditions of animals and plants.

According to the Executing Agency, no issues in relation to the natural environment were identified by the time of ex-post evaluation, nor were any negative impacts during and after project implementation pointed out in the beneficiary survey.

3.3.2.2 Land Acquisition and Resettlement

In this project, land acquisition was anticipated for a total of 1.70km, including 950m for a new road section at the starting point and another 750m in the old railway section (2+350km – 3+100km section). However, it would not pose any issues as the sections were government-owned land. No additional land acquisition was planned as all other sections of the same route were 16m wide. In fact, as the road alignments were all as planned, land acquisition was also carried out as planned. In other words, only 1.70km of government-owned land was acquired.

As all these government-owned land sections were either dry fields or old railway sections. Since no privately-owned land was acquired, there was no resident resettlement under this project. Block walls that had been installed along the road area and needed to be removed prior to project implementation were actually removed by roadside residents. It was confirmed that there were no issues raised regarding land acquisition or resettlement in the beneficiary survey.

This project has largely achieved its objectives; therefore its effectiveness and impact is high.

3.4 Efficiency (Rating:①)

3.4.1 Project Outputs

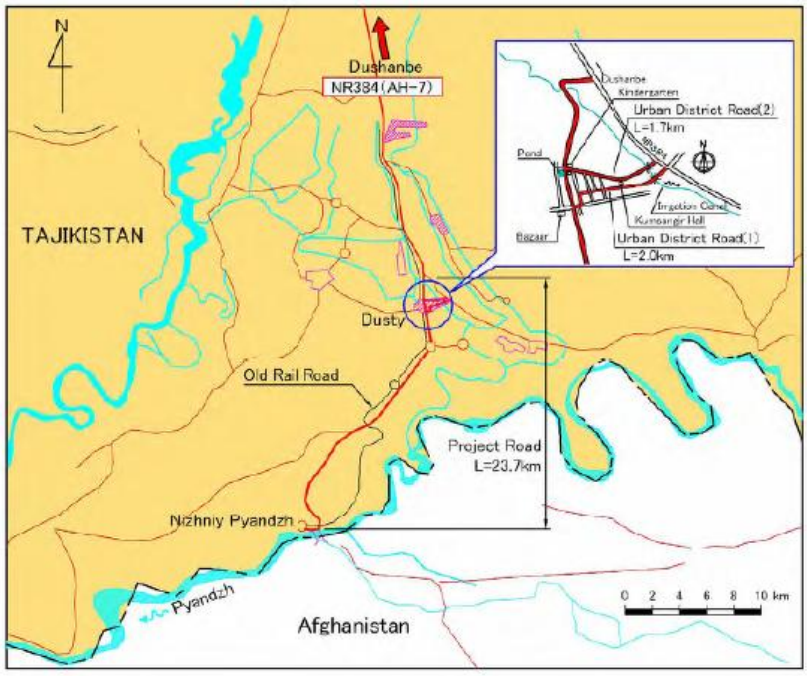


Figure 3: Project Location

In this project, a road section between Dusty and Nijiny Pyandzh (23.7km) and two urban district roads (approximately 3.7km in total) were rehabilitated. The entire period was divided into two phases.

Phase I: To rehabilitate both sides of the road totalling 8.3km between Dusty and Nijiny Pyandzh as well as a total of 3.7km district roads in Dusty town

Phase II: To rehabilitate the remaining section of the road between Dusty and Nijiny Pyandzh (15.3km)

A comparison of original and actual outputs are summarised as follows.

Table 4: Comparison of Original and Actual Outputs

Phase	Road Section	Original	Actual
Phase I	Dusty ~ Nijiny Pyandzh	8.34km	8.25km
	Urban District Road in Dusty Town	3.7km	3.61km
Phase II	Dusty ~ Nijiny Pyandzh	15.36km	15.36km

Road Specifications

Dusty ~ Nijiny Pyandzh: Width 12.0m, Asphalt concrete pavement for the entire section, 3 box culverts, 1.1km drainage facilities, etc.

Urban district road in Dusty town: Rehabilitated width 7.6m, Simplified pavement for the entire section

As shown in the table above, the project output was achieved mostly as planned. The design standard was compliant with the standard of the Asian Highway Network.[13] However, the load bearing capacity of the project road and its design were based on the results of our own survey, as the characteristics of each road such as traffic volume needed to be considered separately.

Changes from the basic design stage were limited to the following items during the second phase, and all other components remained the same.

- Road sign posts were increased from 83 to 102.
- Connecting sections between the main road and each house or other feeder roads were paved with asphalt, changed from a simplified pavement method.
- Lengths of the pavement of six locations connecting the main road and feeder roads were changed from 5m each to 20m each.

These small changes were implemented with instructions from the police or with proposals from the Executing Agency or contractors, and there no issues were identified. In addition to the above, the Tajikistan government was scheduled to undertake the following project components. These were all implemented and facilitated the generation of overall project outputs.

- To acquire government-owned land, removal of obstructing walls
- To obtain approvals for construction and environmental permissions
- To allocate a land section for construction and storage yards and a temporary office
- To relocate all structures such as electric poles and telephone lines in the project road
- To remove trees along the road, etc.

3.4.2 Project Inputs

3.4.2.1 Project Cost

A total cost of this project was planned to be 1,318 million yen, out of which 1,312 million yen would be borne by Japan and 6 million yen by Tajikistan. Construction work was divided into two phases, and the following table summarises a breakdown of the original and actual project costs contributed by the Japanese side.

[13] Class II is one of four road design grades based on the road design standard in the Asian Highway initiative taken by the Economic and Social Commission for Asia and the Pacific (ESCAP), specified in Annex II of the Intergovernmental Agreement signed among the countries concerned.

Table 5: Comparison of Original and Actual Project Costs (Japanese Portion)

(Unit: million yen)

	Phase I		Phase II	
	Original	Actual	Original	Actual
Construction	548	537.5	669	1,197
Designing and Supervision	44	42.6	51	64.4
Total	592	580.1	720	1,261.4

Source: Basic Design Report and Completion Report

The actual cost for Phase I was within the planned amount despite the following factors during project implementation.

(1) Market prices for construction materials increased.

(2) Although the contractor for Phase I had a plan to procure bitumen and all cement from Uzbekistan, a conflict with the country prompted them to prohibit exports of their domestic products to Tajikistan. Bitumen then needed to be procured in bulk units by rail from Russia and cement needed to be transported on long-distance trucks from Pakistan through Afghanistan. Due to this conflict, all the foreign construction companies located in Tajikistan pulled out of the country, requiring the contractor to arrange for all of the construction equipment from other countries including Japan.

As for the Phase II section, the length of the project road was shortened by 2.3km to 13.06km from the original 15.36km in a detailed study undertaken by the consultant in response to the above changes. While a tender was floated in December 2007, procurement conditions for construction equipment and materials had deteriorated further compared to the detailed design period, and there were no bidders for this phase. Following this tender failure, it was judged that Phase II could not be completed under the period specified in the E/N, and this phase was once cancelled in July 2008 after monitoring the progress and completion (June, 2008) of Phase I.

In order to conclude Phase II, a review study was conducted to examine the project cost again by considering the findings on various risks obtained during Phase I on the construction method, period, and procurement of equipment and materials. The study was conducted from August 2008 and a new project cost was calculated at 1,324 million yen, up from the original amount of 720 million yen.[14]

While the cost borne by the Tajikistan side was not specified, it is presumed that the planned amount was disbursed, as all the components to be undertaken by the

[14] Separately, 8.794 million yen was spent for design and supervision work during the initial tender process of Phase II.

Tajikistan government were implemented without delay.

Due to the tender failure caused by a price hike in construction materials, the actual cost was 1,841 million yen (140% of the plan), compared to the originally planned amount of 1,312 million yen.

Therefore, the project cost was higher than the planned amount.

3.4.2.2 Project Period

Planned and actual project periods from the signing of E/N for Phase I until project completion are shown respectively as follows.

Table 6: Comparison of Original and Actual Project Periods

Phase	Original	Actual
Phase I	Detailed Design[15]: 1.5 months Construction: 11.5 months	September, 2006 ~ June, 2008 (21 months)
Phase II	Detailed Design: 1.5 months Construction: 15.5 months	January, 2009 ~ November, 2010 (21.5 months)
Total	29.5 months	September, 2006 ~ November, 2010 (50.5 months)

Source: Basic Design Report and Completion Report

The project period for Phase I was lengthened by 2.5 months, caused by a delay in importing materials (bitumen, cement, etc.), a trade embargo of Uzbek bitumen due to a border closure between Tajikistan and Uzbekistan, and because more time was required to respond to the low quality bitumen brought in from other countries. The period was further delayed by 4.5 months due to the breakdown of an asphalt plant and a suspension of construction work due to heavy snow and extraordinarily low temperatures. Thus, the period for Phase I totalled 21 months.

The E/N for Phase II was signed in July 2007 and a consultant contract was signed in the following month. However, as mentioned above, this phase was cancelled in August 2008 due to the tender failure for construction work. After a review of the project cost, a revised E/N was signed again in January 2009. During the review study, another five months were added to the project period for preparation work and installation of safety equipment. Therefore, a new project period of 22 months was set and actual construction work was completed in 21.5 months, within the revised period.

Based on the above, the entire project period turned out to be 50.5 months between

[15] A detailed design survey was undertaken together with the preparation of tender documents after a contract for consulting services on project implementation was signed. The majority of the design was substituted during the basic design stage.

September 2006 and November 2010 (171% of the plan), substantially longer than the planned period of 29.5 months.

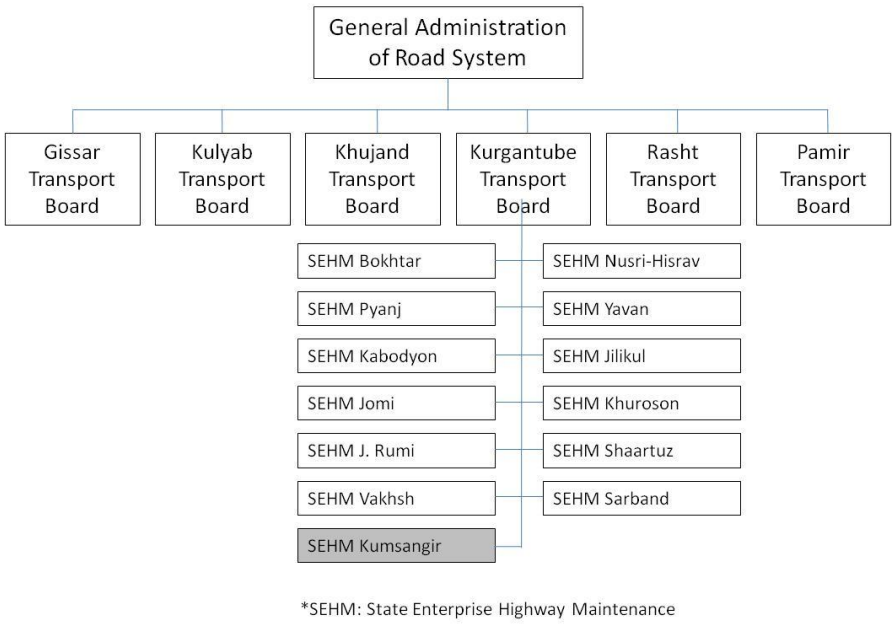
The project cost exceeded the plan, while the project period significantly exceeded the plan; therefore the efficiency of the project is low.

3.5 Sustainability (Rating:②)

3.5.1 Institutional Aspects of Operation and Maintenance

The Executing Agency of this project is the Ministry of Transport and the actual operation and maintenance work was undertaken as planned by the Kurgantube Transport Board (30 staff members),[16] under the General Administration of Road System. The Kurgantube Transport Board supervises 13 State Enterprises Highway Maintenance (SEHM) offices, one of which is SEHM Kumsangir, in charge of the maintenance of the project road. The number of staff at SEHM Kumsangir is 38, slightly lower than 44 working during the planning period, but it was noted that there were no issues in the smooth implementation of maintenance activities. No maintenance work is outsourced and everything is managed directly by the office.

The SEHM Kumsangir controls a total of 255.8km of road: 65.8km of international highway, 8.4km of national highway, and 181.6 of provincial road.



Source: Information provided by the Executing Agency

Figure 4: Organisational Structure of MOT's Road Management (Simplified for the Report)

[16] The total number of staff in the Khatlon Province including those at 13 SEHM offices is 531 (as of 2013).

3.5.2 Technical Aspects of Operation and Maintenance

During project planning, while routine maintenance work such as pothole repair was undertaken by SEHM Kumsangir, a shortage of maintenance equipment was hindering major rehabilitation works such as overlaying, since specialised equipment would have been required. It was also deemed that they also did not have the experience needed to complete the task. At the time of ex-post evaluation, road surface conditions (damages) of the project road were assessed through frequent inspections by SEHM Kumsangir, and it was observed during the site visit that those inspections and cleaning of the road were implemented without problems. However, according to the Executing Agency, no systematic training programmes were provided to the maintenance personnel by MOT or SEHMs, and the means of acquiring advanced knowledge was only through domestic and international training programmes offered by donors including JICA (e.g. Training in Japan for engineers of the Kurgantube Transport Board). However, a technical cooperation project on operation and maintenance and a grant aid project providing equipment required for rod maintenance have just started as part of Japanese assistance. It is therefore expected that the operation and maintenance capacities of the engineers / technicians will be enhanced.

During the ex-post evaluation survey, the Executing Agency commented that the technical level of the maintenance personnel was sufficient. However, even with some knowledge, the quality of the repaired road surface was insufficient, and further repair work was always required. The main factor in the poor quality of patching work is the difficulty in producing and/or obtaining good quality asphalt and a lack of equipment. During the site visit, repair work was being conducted for the second time on a spot that was already repaired once after the project.

Photo 3: Subsequent repair work on a spot once repaired by SEHM (Phase II section)

3.5.3 Financial Aspects of Operation and Maintenance

MOT's maintenance budget was sourced from a road fund, comprising vehicle and fuel taxes until 1999, but it was abolished in 2000 and is now allocated from the general budget. The maintenance budget has consistently increased, and has been at a level of 4 ~ 5% of MOT's total budget.

Table 7: MOT's Maintenance Budget

	Budget (thousand Somoni[17])	% change from the previous year
FY 2003	4,950	—
FY 2004	12,000	142.4
FY 2005	18,100	50.8
FY 2006	21,540	19.0
FY 2007	22,173	2.9
FY 2008	25,150	13.4
FY 2009	30,300	20.5
FY 2010	34,000	12.2
FY 2011	39,000	14.7
FY 2012	46,800	20.0

Source: Data provided by the Executing Agency

Table 8: Maintenance Budget and Expenditure of SEHM Kumsangir

(Unit: thousand Somoni)

	Budget	Expenditure	Balance
FY 2003	35	41	-6
FY 2004	75	104	-29
FY 2005	180	280	-100
FY 2006	245	320	-75
FY 2007	234	380	-146
FY 2008	237	385	-148
FY 2009	374	410	-36
FY 2010	376	422	-46
FY 2011	376	422	-46
FY 2012	468	512	-44

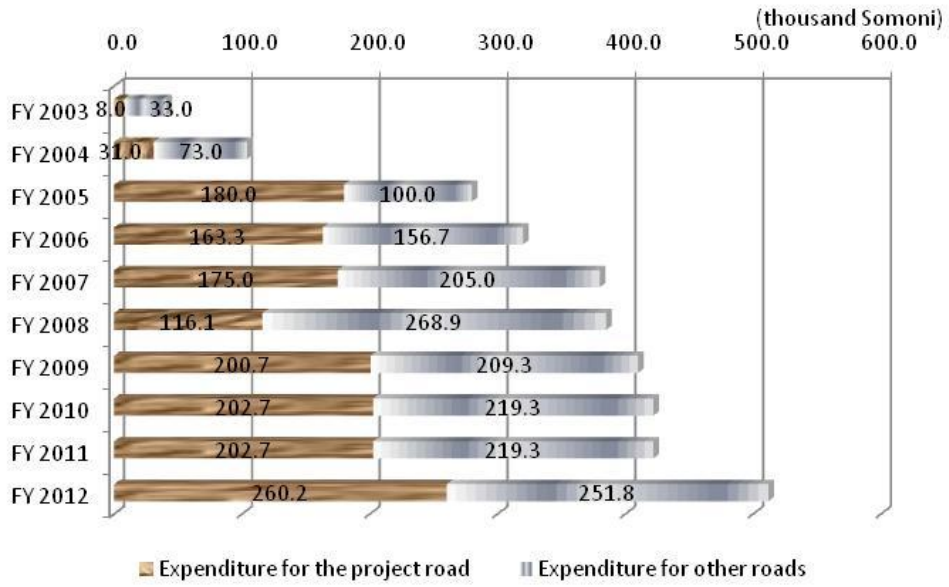
Source: Data provided by the Executing Agency

In parallel with the overall increase in maintenance budget for the MOT, the maintenance budget for SEHM Kumsangir is also generally increasing. However, with chronic budget shortcomings, they cannot purchase sufficient equipment and required materials.

The amount of expenditure for maintenance activities of SEHM Kumsangir is always in excess of the budgeted amount.[18] One of the main reasons for this is that the amount of expenditure for the project road significantly exceeded the originally estimated amount. At the time of planning, maintenance work on the project road was expected to be manageable, as the annual maintenance cost necessary for the project road was estimated at 53,600 Somoni. The distance of the project road out of the total distance covered by SEHM Kumsangir was 37%, but 30% of the SEHM Kumsangir maintenance budget for 2005 was thought to be required after project completion. The actual expenditure for maintenance of the project road is, however, more than half of the total amount spent by SEHM Kumsangir (approximately 260 thousand Somoni in FY2012, 55% of the total), which is almost five times larger than the planned amount. Damages continue to occur even after project completion, and repairs are prioritised on the project road as it is an international highway.

[17] 1 Somoni = Approx. 21 yen (as of July 2013)

[18] In case the initial budget is used up halfway through the year, a request for additional allocation will be submitted. If granted, additional budget will be allocated during the last quarter of that financial year. This is why the amount of expenditure always exceeds initial budget figures.



Source: Data provided by the Executing Agency

Figure 5: Annual Expenditure by SEHM Kumsangir

As discussed above, the maintenance budget is chronically insufficient, making it difficult to purchase enough equipment and materials. Expenditures for maintenance of the project road have not been reduced even after project implementation, and SEHM Kumsangir receives additional budget to cover excess expenditure by submitting a request during that financial year. According to the Executing Agency, the required amount has never been met.

3.5.4 Current Status of Operation and Maintenance

Various damages started occurring soon after the completion of construction work on the project road, and a number of repairs have been made thus far. With this additional repair work, the one-year warranty inspection surveys normally conducted once after the completion of each phase were actually conducted twice.

The following damages were mainly observed during the site visit.

- With regard to the major highway section, a number of repairs were made by the contractor around the warranty inspection period, especially in the Phase II section. While the level of damages was not so severe as to disturb smooth traffic flow, several damages to the road surface were spotted even after repairs were done during the warranty inspection. SEHM Kumsangir has been repairing such damages continuously.
- In the Phase I section, several undulating points were observed on the road surface

of the main highway on the Dusty town side.

Photo 4: Road surface repaired after damages (Phase I section: surfaces are undulating and the median line is winding.)

Photo 5: Road surface repaired again after damages (Phase II section: insufficient strength of asphalt)

- Urban district roads in Dusty town with double bitumen surface treatment (DBST) were more heavily damaged, with potholes and cracks.

As a response to overloaded vehicles, efforts have been made by checking the weight of all trucks arriving from the Afghanistan side at the weight inspection station in Nijiny Pyandzh as mentioned in '3.3 Impact'. Also in November 2011, a government order was issued to allow only vehicles with an axle load of 6 tons or less between 10 a.m. and 8 p.m. from 1 May to 31 August if the temperature is above 25 degrees Celsius. However, the station has only an old-style portable scale and cannot always measure exact weights of the trucks.

A maintenance plan is formulated and inspections are regularly conducted by SEHM Kumsangir, but it is difficult to implement repair work in accordance with the schedule due to insufficient budget allocations. With a lack of asphalt plants, road surface repairs are done with cold asphalt, which is less durable and coarser. As demonstrated, there are difficulties in procuring materials and road maintenance equipment such as compactors. It is therefore difficult to say that sufficient repair work has been conducted.

As stated above, in response to these issues, the equipment required for road maintenance will be provided to 13 SEHMs under the Kurgantube Transport Board through a grant aid project that started in March 2013. Moreover, a technical cooperation project on road management capacities is to be implemented from 2013, and it is hoped that this project will contribute to the enhancement of technical capacities on road maintenance as well as the skills on budget requests.

Some problems have been observed in terms of finance and maintenance conditions; therefore the sustainability of the project effect is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project, in which major arterial roads were rehabilitated to ensure safe and stable traffic and transportation in the south-western part of the landlocked country of Tajikistan, was consistent with the development plan and needs of the country both during planning and ex-post evaluation. It was also relevant with the ODA policy of Japan during the planning stage. The effectiveness and impact of the project was high as this project achieved considerable reductions in travel time and flooding on the international highway. It also underpinned increased traffic and freight volumes and contributed to the improvement of access to a market and major cities. However, the efficiency of the project was low due to the excesses in project cost and periods compared to the plan, as the prices of construction materials escalated and more time was spent on countermeasures to the changes in procurement conditions. Also, some sections of the road began showing damage soon after the completion and some of the road surfaces still needed to be improved even during the ex-post evaluation. While the major causes are assumed to be an increased traffic volume and the passage of overloaded vehicles after project completion, shortages of budget and repair equipment of the executing agency have also resulted in insufficient repair works on the damaged sections. On the other hand, installations of vehicle weighing equipment and an establishment of management structure to crack down on overloaded transport vehicles were being explored. Also, concrete initiatives were taken for the appropriate procurement of maintenance equipment and materials, as well as for capacity building of the engineers concerned. Therefore, the sustainability of the project can be judged to be fair.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

In the landlocked country of Tajikistan, proper maintenance of the roads has a high level of significance for the country's economy and society, as the proportion of transport over roads is high compared to other transport modes. Also, the country has several international highways such as the Asian Highway and CAREC corridors, part of which is a road section rehabilitated in this project. As such, it is essential to raise awareness within the government of the importance of road maintenance, as

opposed to merely constructing new roads. It is also important to secure a level of budget sufficient to improve and maintain road conditions, and establish a structure to develop the capacities of maintenance personnel. In addition, the need to strengthen institutional capacity in vehicle weight inspection to prevent the passage of overloaded trucks is also anticipated

4.2.2 Recommendations to JICA

Considering the short period of time that passed after project completion, damages to road surfaces of the project road were relatively severe. While the contractor repaired the damaged sections more than required in its warranty, further damages have kept occurring even after that. On the other hand, the surfaces improved in the subsequent project 'The Project for Rehabilitation of Kurgan Tyube - Dusty Road' have been far better than those of this project after the same period. With the increasing traffic volume, it is desirable that the conditions of the road surfaces covered in this project be monitored, and discussions with the Tajikistan government held as needed.

4.3 Lessons Learned

As this project was the first grant aid project in the road sector in Tajikistan, where weather conditions were severe, it seems to have been important to allocate more time for fact finding, to design the road more carefully by conducting a full-scale detailed design study, and to allow more leeway in terms of project period.

It is also thought that more involvement by the Executing Agency during the designing phase was necessary. Also, it was necessary to plan project details with a more in-depth examination of weather and local procurement conditions, which would have allowed the project to be implemented smoothly with high quality road construction.

(End)

Mongolia

Ex-Post Evaluation of Japanese Grant Aid Project

"The Project for Construction of the Eastern Arterial Road and Improvement of the Related Equipments"

External Evaluator : Hisae Takahashi
Ernst & Young Sustainability Co., Ltd.

0. Summary

This project was conducted to develop two of the six sections in the "Millennium Road Plan" which was formulated by Mongolia to enhance the quality of life in the region through the development of east-west transportation. Thus, as the project meets the needs and development policy of Mongolia and was consistent with Japanese assistance policy, its relevance is high. Since both project cost and period were within the plan, its efficiency is also high. By developing the road and bridges, the quantitative effects of decreasing travelling time on the target road, removing weight restrictions on bridges and increasing the traffic amount have been confirmed. Also mitigating the adverse impacts of a loss of grassland, reducing maintenance costs and securing better access to major cities were identified as qualitative effects. Furthermore, upon the project's completion, the standard of living has been improved through effects such as the lowering of prices and an increase in the number of shops in towns alongside the target road, hence the effectiveness is high. Although the road and bridges are well maintained under the current circumstance, minor concerns in terms of securing a budget and spare parts for equipment needed for maintenance works remain, thus the sustainability is fair. In light of the above, this project is evaluated to be highly satisfactory.

1. Project Description

Project Location

Developed Road

1.1 Background

In Mongolia, transportation of both people and commodity depends on road transportation

to a large extent. Therefore, poor road condition incurs adverse impacts to economic development. Particularly, east-westward transport from Ulaanbaatar fully depends on road transport, while the railway connected Irkutsk in Russia to Beijing in China via Ulaanbaatar from north to south. At the time of project planning, road condition of east-westward transport was, however, far from safe and stable means because of very few paved section and this poor road condition incurred adverse impact.

Under that circumstance, the Government of Mongolia approved the implementation of the Millennium Road Project (total length of 2,200km) to connect long-distance regions by arterial road, aiming to facilitate the transport efficiency, industries and service capabilities, as well as regional development and improves the quality of life. The Millennium Road Plan comprises one horizontal (east –west) arterial road as "Millennium Road" which advances the nations in the aspect of settlement and regional development project and five vertical (north-south) arterial roads to stimulate regional development. The "Eastern Arterial Road" is the road section from Erdene to Undurkhaan of Millennium Road, and it comprises six sections (total length of 260km). Since the Eastern Arterial Road was expected to bring about high economic effects, the Government of Mongolia put highest priority on its development in 2001 and the Government of Mongolia requested the Government of Japan to construct two sections and bridges which did not satisfy international standards and caused transportation bottlenecks.

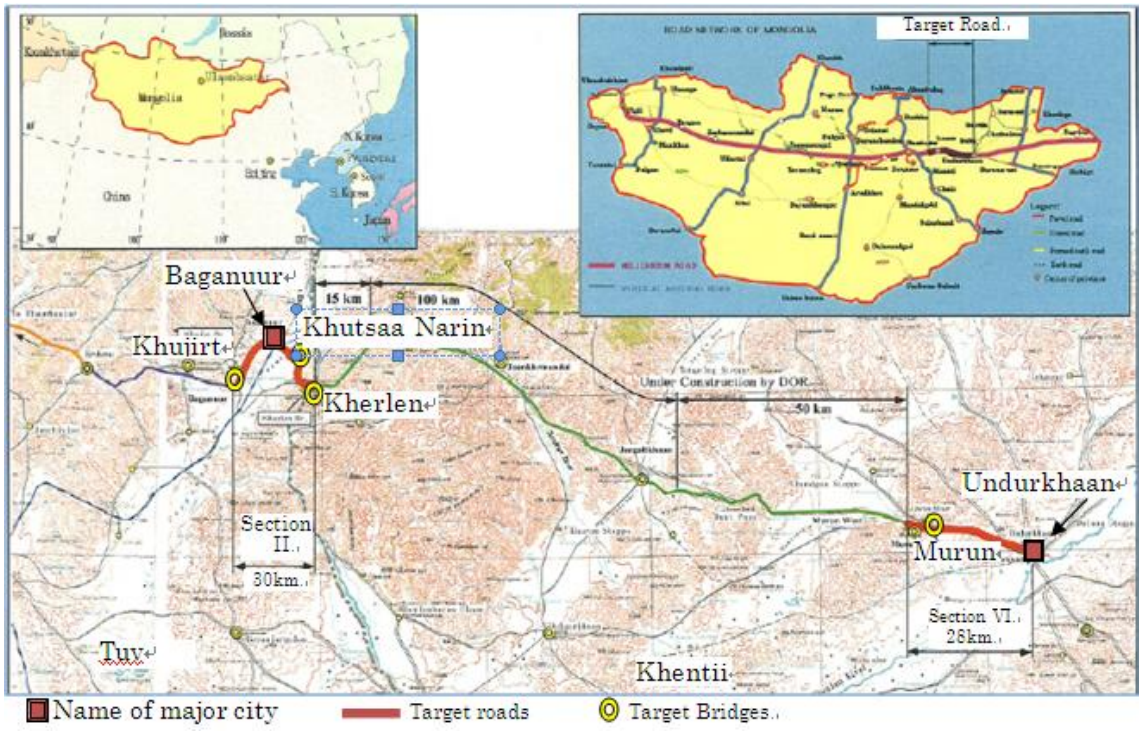


Figure 1 Project Location

1.2 Project Outline

The objective of the project is to ensure safe and smooth transportation through the rehabilitation of asphalt pavement, construction of a new road and bridge (as well as replacement of existing bridges) in two[1] sections of the entire eastern arterial road.

Grant Limit / Actual Grant Amount	2,944 million yen /2,913 million yen
Exchange of Notes Date	June, 2005 (Phase I), May, 2006 (Phase II)
Implementing Agency	Ministry of Road and Transportation
Project Completion Date	December , 2006(Phase I), September, 2009 (Phase II)
Main Contractors	Konoike Construction, ITOCHU Corporation
Main Consultants	Japan Overseas Consultants
Basic Design	"Basic Design Study on the Project for Construction of the Eastern Arterial Road and Improvement of Equipment for Road Construction and Maintenance in Mongolia", JICA, March, 2005.
Detailed Design	June, 2004 – March, 2005
Related Projects	(JICA)Feasibility Study on Construction of Eastern Arterial Road in Mongolia(2001-2002), (ADB)Master Plan for National Road Network, and Feasibility Study(1994), (World Bank)New low Cost Road Development and Rehabilitation(1997-2000)(2001-2003), (USA)Road Surface Rehabilitation (2002-2004)

2. Outline of the Evaluation Study

2.1 External Evaluator

Hisae Takahashi (Ernst & Young Sustainability, Co., Ltd.)

2.2 Duration of Evaluation Study

Duration of the Study: November, 2012 – October, 2013

Duration of the Field Study: May 19 – June 1 and June 30 – July 5, 2013

3. Results of the Evaluation (Overall Rating: A[2])

3.1 Relevance (Rating: ③[3])

3.1.1 Relevance with the Development Plan of Mongolia

The "Action Plan of the Government of Mongolia for 2004 -2008", a development policy in place when planning this project, primarily emphasized 1) quality improvement of public services, 2) development of political, economic and social legal systems as well as a safe living

[1] Two sections: namely section II which connects Baganuur and Kherlen in Tuv Province and section VI which connects Murun and Undurkhaan in Khenri Province.

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

[3] ③: High, ②: Fair, ①: Low

environment, 3) high economic growth led by the private sector, 4) improvement of the legal system and standard of living, and 5) human resource development. This plan emphasized road development as one of the strategies to eliminate the gap between urban and regional areas through 3) the above mentioned high economic growth led by the private sector. Also, in the development policy released at the time of ex-post evaluation, the "Action Plan of the Government of Mongolia for 2012 -2016", development of infrastructure was described as an important area to ensure economic development and to promote sustainable development. This plan set a road sector goal to connect all the major cities and Ulaanbaatar with paved road by 2016.

Recognizing that delays in road development hinder economic development, the "Millennium Road Project" was formulated in 2001 in Mongolia. This plan was comprised of the east-west road acting as an arterial road to contribute to national development and five south-north arterial roads[4] to promote regional development. This plan aimed to facilitate transport efficiency, improve industries, service capabilities and the standard of living in regional areas through regional development from the perspective of settlement and regional development plans. As of the ex-post evaluation, the "Government Policy for Developing Road Sector of Mongolia" which was formulated by the Road Construction Department of the Ministry of Road and Transportation in 2012, includes the scope of the "Millennium Road Plan". This policy stated that 60% of unpaved road will be developed to paved road by 2012 and 100% will be developed with financial resources by 2016.

As mentioned above, development of the regional economy and road development which helps to stimulate the economy have been placed as priority areas both at the time of project planning and ex-post evaluation. The road sector policy has also been aimed to develop infrastructure in order to consistently connect major cities with Ulaanbaatar, the capital city. Thus, it can be concluded that this project which aimed for a safe transportation service by developing a road which connects Ulaanbaatar and the eastern area has been consistent with development policies and measures both during the planning and ex-post evaluation.

3.1.2 Relevance with the Development Needs of Mongolia

In Mongolia, where transportation of both people and commodities is largely dependent on road transport, poor road conditions produce adverse impacts on economic development. This is particularly true east-west which fully depends on road transport and is far from a safe and stable means throughout the year. At the time of project planning, 75% of the total 11,000km of

[4] The subject of this project was for two sections out of six sectionsof the eastern arterial road where development had not commenced. This eastern arterial road includes the sections started from Erdene to Undurkhaan with a total length of 260km. For the other four sections, road development was completed for one section and the process for construction for development was commenced for three sections at the time of planning.

national road in Mongolia remained unpaved. The ratio of unpaved national road in the eastern area, except Tuv province, was even higher and 99% were earthen road or gravel road, thus the development of an arterial road in the eastern area was an urgent issue.

Roads are the only means of transportation to connect the eastern area while railways only connect south-north even at the time of ex-post evaluation. Furthermore, the unpaved national road ratio is still 24% of the total 12,722km of national roads in Mongolia and 85% of the total 2,610 km national roads in the eastern area. Since the eastern area has many historical sites for tourism and an arterial road to the eastern area is one of the major routes to connect the sea side, an arterial road to the eastern area is a critical road for economic development in Mongolia.

Based on the above, the need for developing roads to connect major cities has been high both at the time of project planning and now for the economic and social development in Mongolia. Furthermore, improvement of road conditions for two sections which play the important role of connecting Ulaanbaatar and the eastern major cities is critical for smooth transportation and economic and social development in the region, hence the road development in the eastern area is still high at the time of ex-post evaluation.

3.1.3 Relevance with Japan's ODA Policy

In the country assistance program to Mongolia which was formulated in 2004, four priority policy targets were set. Among them was "support for infrastructure development to promote economic activities", thus this project was consistent with Japan's ODA policy.

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 Effectiveness[5] (Rating: ③)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

At the time of project planning, reducing travelling time (increasing the average travelling speed) and diminishing weight restrictions on bridges were expected as quantitative effects of the project. In addition to those indicators, changes in traffic volume were also examined in this ex-post evaluation.

3.2.1.1 Changes in Travel Speed

When this project was planned, the average speed on the target roads was 20-40 km/hour (h) and it was expected that this speed would increase to 60-80km/h through road improvement. In this ex-post evaluation, it was confirmed that the average travelling speed in the two target sections improved to 80km/h according to the interview survey of the executing agency. The

[5] Sub-rating for Effectiveness is to be put with consideration of Impact

speed was measured in both section II and VI during this survey and the result shows that travelling at a speed of 80km/h was possible without issue, excluding intersections or speed bumps. However, a part of section VI between Murun Bridge and Undurkhaan, the capital of Khentii Province in the eastern area, is now under maintenance works due to a crack caused in 2012, therefore the average travelling speed in this particular area is currently about 50km/h.

Additionally, travelling time also decreased along with the improvement of travelling speed. For example, it took about four hours from Ulaanbaatar to Baganuur in section II before project implementation, but now it has been shortened to about two hours. From Ulaanbaatar to Khentii Province in section VI, travelling time decreased to about five hours, despite having taken about eight to ten hours before road development as shown in Table 1.

Table 1 Changes of Travelling Time before and after the Project

Section	Travelling Time	
	Original	Actual
Ulaanbaatar ⇒ Baganuur (Section II)	About 4 hours	About 2 hours
Ulaanbaatar ⇒Undurkhaan (All 6 sections of Millennium Road including section II and VI)	About 8-10 hours	About 5 hours

Source: Prepared based on the interview survey of the Ministry of Road and Transportation, Road maintenance authority and results of a measurement survey of the target road.

3.2.1.2 Increase of Heavy Vehicles

As two[6] of the target four bridges were wooden bridges before the project, only small trucks were able to pass on them. On another two bridges[7], only heavy vehicles with a loading capacity less that 14 tons were allowed to pass as they were also heavily dilapidated. According to the project documents prepared at the planning period, it was expected that 20 ton trucks as well as trailers with loading capacities of 43 tons would be able to pass on all of the bridges. By upgrading bridges through this project, all four bridges increased their strength and now there are no weight restrictions except on Kherlen Bridge[8], thus it can be judged that the target has been achieved.

(Photo) Rehabilitated Bridge
(Khutsaa Narin Bridge)

On the other hand, due to the mitigation of weight restrictions, heavy vehicles loaded with a large amount of construction materials and coal were frequently observed and there is a concern of damage to the road conditions in the future. As a countermeasure, the Ministry of Road and

6 Khutsaa Narin Bridge and Murun Bridge.
7 Khujirt Bridge and Kherlen Bridge.
8 At Kherlen Bridge, a loading capacity of 44tons was allowed though it was not actually measured by measuring equipment.

Transportation has placed measurement equipment to regulate the overloading of vehicles at the Kherlen Bridge and is now preparing to start their operation.

3.2.1.3 Increase in Traffic Volume

The traffic volume was not set as an indicator for the effect of the project, however, the Basic Design report (hereinafter referred to as "B/D) indicated the original and planned traffic volume which was surveyed in the Feasibility Study report (hereinafter referred to as "F/S"). Traffic volume was therefore collected in the ex-post evaluation survey and it was confirmed that the daily traffic volume including cars, trucks and busses rose threefold. Figure 2 shows the original traffic volume in 2004 and the planned traffic volume in 2010 and 2015, as well as the actual volume in 2012. Actual numbers as of 2012, (the second line from the right) has increased threefold from the original volume as of 2004, and it has even exceeded the planned traffic volume of 2015. This result can be said to demonstrate that the developing road has contributed to stimulating smooth transportation of both people and commodities.

When conducting the interview survey at Tsenkhermandal, a town used as a resting and eating spot located between section II and VI, it was heard that the number of bus operations[9] have increased from once a week to twice a day after project completion which has contributed to better transportation and revitalization of small commercial activities.

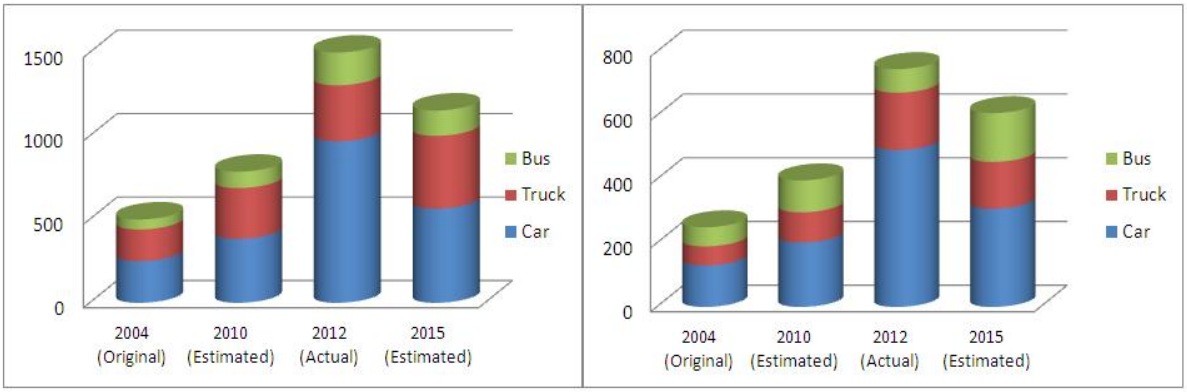


Figure 2 Original, Planned and Actual Daily Average Traffic Volume
(Left: Section II, Right: Section IV)

Note: Calculated based on a 24-hour traffic-volume survey conducted at Kherlen Bridge in Section II and Murun Bridge in Section IV (two days).
Source: Prepared based on the B/D report and the documents provided by the Road Supervision and Research Centre's Ministry of Road and Transportation.

[9] Busses operate mainly between Ulaanbaatar, the capital of Mongolia and Undurkhaan, a main city in the eastern area.

3.2.2 Qualitative Effects

3.2.2.1 Mitigation of Adverse Impacts of a Loss of Grassland

Before the road was improved by the project, the road was unpaved and multiple shifting tracks were made. Therefore it was expected that those adverse impacts caused by vehicle and truck dust to grassland would be mitigated by the project implementation. The B/D report explained that the approximate lost area of 12% would be reduced even after consideration of the loss caused by the road embankment. When interviewing the executing agency, no quantitative data has been collected on this issue, however it was explained that multiple shifting tracks have been changed to a single paved road and so no vehicles drove on the road side after the road was paved. Accordingly, grassland which used to be disturbed by vehicles and dust has started to re-grow. This situation shows that the adverse impact to grassland has been mitigated. When driving along the road at the ex-post evaluation, new grass was confirmed to have started growing at some parts of the target road side.

(Photo) The target road where some new grass has started growing on the road side.

3.2.2.2 Reduction of Travelling Costs and Maintenance Costs

Based on the results of a beneficiary survey[10] and interview survey conducted at the ex-post evaluation, reduction of travelling costs and maintenance costs of vehicles were raised as effects of road development. Although specific quantitative data or amounts were not available, 88% of the respondents answered that the maintenance costs for vehicles had been reduced after the road development. In addition, a half of them indicated that approximately 20-40% of maintenance costs was saved, which means that the improvements of road conditions had contributed to lower fuel costs as well as reductions in abrasions and tire damages.

【Result of beneficiary survey】

【Question】Have travelling cost or maintenance costs been reduced compared to the situation before road development?	Largely reduced	Reduced	Same	Increased	No Answer
	22 %	67 %	5 %	1 %	5 %

Respondents who answered that the costs were reduced【Question】How has it been reduced?	<20%	20-40%	50%	50%<	No Answer
	9 %	51 %	20 %	11 %	9 %

[10] Beneficiary survey was conducted in June 2013 by interviewing 100 beneficiaries at the project road section. Details of beneficiaries were as follows: 8 bus drivers, 15 truck drivers, 41 car drivers, 7 merchants, 18 residents and 8 tourists and 3 others.

3.2.2.3 Better Access to Major Cities and Social Services

Access to major cities has been improved by developing the arterial road between the neighbouring area of Ulaanbaatar and major cities in the eastern area. It relates to the above mentioned effects which include increases in the traffic amount, shorter travel and transport times. Also, nowadays large sized share-ride buses operate twice a day which was the once a week due to bad road conditions before the road development. In addition, taxis also frequently shuttle between major cities at present. Those changes have increased the choice and ease of transportation for people in the eastern area. Even in the beneficiary survey results, all respondents stated that access between major cities[11] has been improved.

3.3 Impact

3.3.1 Intended Impacts

3.3.1.1 Stimulated Regional Economic Activities

When project planning, stimulating the economy in the eastern area was expected as an indirect effect through the elimination of weight restrictions on vehicles on bridges and the reduction of travelling or transportation costs. Since regional industry data or macro data including those on regional Gross Development Product were not available, the impact was not analysed quantitatively. Therefore, a beneficiary survey and interview survey were conducted to ascertain the impact of the project. The results show that 88% of respondents answered that regional economic activities were “highly stimulated” or “stimulated”, which indicates a certain level of economic impact was produced in the target area. In particular, petrol stations and stores were opened on the target road side, which resulted in an increase in employment, and also access to major cities was increased which contributed to smooth transportation of people as well as goods. Also, according to the data on unemployment, the rates of Baganuur district (Section II) and Khentii Province (section VI), where the target road is located, are relatively lower than the national average or other regions (it was almost the same before project implementation in 2004 as shown in Figure 3).

[11] In particular, access between Ulaanbaatar, a capital of Mongolia and Baganuur, which is known as a coal mine city or Undurkhaan, the capital of Khentii Province in the eastern region was significantly improved.

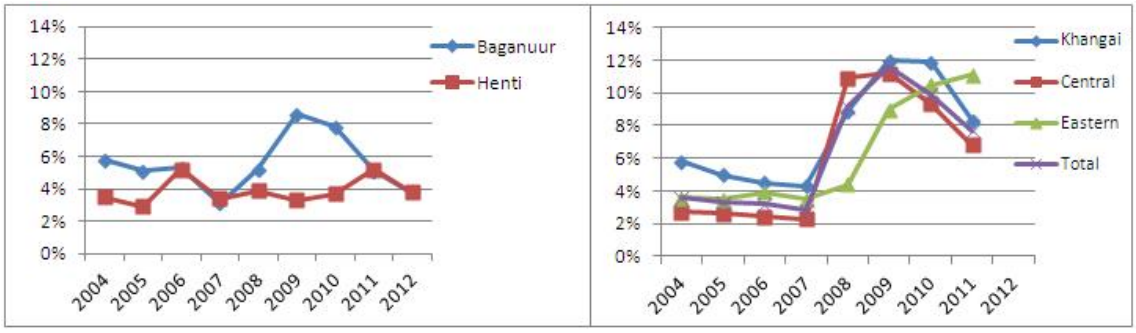


Figure 3　Unemployment of the Target Area and Each Province of Mongolia

Source：Prepared by the evaluation team based on documents provided by the Baganuur District Office, Khentii Provincial government office and the National Statistical Office of Mongolia, "Mongolian Statistical Year Book".

It is difficult to prove the direct relation between the unemployment rate trend and the project, but it can be considered that better transportation of people and goods as well as the increase in stores stimulated the regional economy and then contributed to the improvement of the employment situation.

3.3.1.2 Improvement of Standard of Living

At the time of planning, it was expected that the standard of living would be improved as the improvement of bridges and road conditions would enable people to have better access to markets and social facilities including schools, hospitals, etc. But in fact, it was not the improvement of access to those facilities but rather the following positive impacts for daily life that were explained as indirect effects by the development of the arterial road.

- Lowering price of commodities
- Increase in the number of shops and variety of goods
- Reductions in travelling time and securing leisure time

According to the results of interviews and beneficiary surveys on staff of the Baganuur district office, Khentii Provincial office and road maintenance companies of the target sections, almost all respondents answered “commodity prices have become cheaper and the varieties of commodities have increased thanks to the improved transportation after the road development”. In inland country Mongolia, goods are basically transported from the capital or major cities to regional areas, thus commodity prices get higher and the variety smaller the farther one gets from major cities. Before the road development, the prices of both food and daily commodities were relatively high compared to those in Ulaanbaatar. Under the current circumstances, however, it is possible to get these commodities at almost the same price as Ulaanbaatar in Khentii Province. The main reasons for this positive impact are considered to be the better access and smooth transportation brought about by the road development.

3.3.2 Other Impacts

3.3.2.1 Impacts on the Natural Environment

As mentioned in "3.2.2 Qualitative effect", multiple shifting tracks have changed to one paved road thanks to the road improvement, which has resulted in a mitigation of adverse impacts to grassland. On the other hand, no negative impacts due to the project's activities were confirmed through the interview survey of the executing agency's staff or the beneficiary survey.

3.3.2.2 Land Acquisition and Resettlement

The target road is located in the middle of grassland where there are no residential areas or stores except a few urban sites. In some of these urban sites, including Baganuur district and Undurkhaan, the project rehabilitated the existing road and therefore no land acquisitions or resettlements were required, which was also confirmed by the beneficiary survey of the executing agency's staff .

3.3.2.3 Unintended Positive/Negative Impact

Other unintended positive impacts explained in the beneficiary survey were as follows.

【Degree of satisfaction of beneficiaries】

According to the beneficiary survey, 95% of respondents indicated an improvement of transportation services such as bus operations and 80% indicated smoother road conditions as an effect of the road development. As a result, 72% of respondents were satisfied with the current road condition.

【Increase in the number of tourists】

According to the statistics of Khentii Province, the number of tourists visiting Khentii Province doubled for Mongolian tourists and foreigners increased threefold compared to before the project as shown in table 2. Before the road was improved, even the arterial road was unpaved, therefore it took a longer time for transportation and the operations of bus services were also very limited. It is considered that the shorter travelling time, better road conditions, accessibility of large size busses and various other factors have contributed to increases in the number of tourists.

Table 2 Number of Tourists in Khentii Province

Before project implementation (2005)		After project implementation (2012)	
Mongolian	Foreigners	Mongolian	Foreigners
5,356	980	12,208	2,839

Source: Documents provided by Khentii Provincial Office

As explained, this project has largely achieved its objectives, therefore its effectiveness and impact is high.

3.4 Efficiency (Rating: ③)

3.4.1 Project Outputs

In this project, two of the six sections of the road of the Millennium Road Project, namely section II located in Baganuur district in Ulaanbaatar and section IV located in Khentii Province, with a total length of 260 km connecting Erdene and Undurkhaan were rehabilitated and constructed. Also, bridges alongside the two target roads were upgraded or newly constructed. In addition, equipment was procured and soft components implemented for road maintenance. The comparison of planned and actual outputs is listed in table 3 and table 4.

Table 3 Planned and Actual Outputs (Japanese Side)

	Planned	Actual
Road and Bridges Section II	Rehabilitation of existing asphalt pavement 15.8km Construction of new road 14.0km Bridge construction 2 Bridge upgrading 1	Implemented as planned
Section VI	Rehabilitation of existing concrete pavement 0.25km Construction of new road 27.6km Bridge construction 1	0.21km 27.9km Implemented as planned
Equipment *Numbers in brackets indicate the numbers of procured equipment.	Motor grader(2), Vibration roller(4), Asphalt finisher(2), Asphalt plant(2), Water tanker(2), Crusher plant(2), Asphalt cutter(7), Plate compacter(5), Pickup truck(7), Cargo truck with crane(2), Line maker(2), Asphalt testing equipment(2), Backhoe loader(7), Road maintenance truck(5), Vibratory rammer(7), Dump truck(6), Wheel loader(4), Trailer(1), Asphalt Sprayer(2)	Implemented as planned
Soft Component	Purpose: Enhancing O&M capacity on a maintenance management system for equipment Contents: 1) group trainings for equipment maintenance, and 2) pilot construction technical training	Total 16.9M/M Equipment maintenance: 3M/M, Technical training: 13.9 M/M Contents : -Development of a manual for Operation and Maintenance (Hereinafter referred to as "O &M") -Group training (O&M seminar: 58 recipients) -Technical training (paving and O&M seminar: recipients 79)

Table 4　Planned and Actual Outputs (Mongolian Side)

Planned	Actual
・Securing lands and clearing construction sites ・Securing concession on borrow pits, sand pits and quarry sites ・Securing land for plant, and installation of gate and fences. ・Constructing road side stations(michi no eki), monuments and planting trees ・Providing distributing line and telephone trunk line	Implemented as planned

The designs of side drainage and casting were partially amended for securing safety based on the results of a detailed design survey on geological and rainfall investigations. It is, therefore, considered reasonable. There were no other modifications on outputs.

In the soft component, manuals for O&M were prepared, and group training for O&M on equipment as well as pilot construction technical training was conducted to transfer the skills for road maintenance to technical staff and the operators of road maintenance companies, namely Baganuur AZZA and HARGUI. The Mongolian side also carried out the foundation construction, monument construction, etc. as planned without any delay.

(Photo) Kherlen bridge constructed in Section II

（Photo） Procured equipment: Crasher plant

3.4.2 Project Inputs

3.4.2.1 Project Cost

The planned project cost covered by Japan was set at 2,932 million yen[12] and the actual project cost totalled 2,913 million yen, 99% of the original plan, which was mostly as planned. Figures on the amount covered by the Mongolian side were not available from either the Mongolia or Japanese side, however, it was confirmed that the executing agency carried out all the planned foundation construction. Thus, the planned cost was thought to be covered by the Mongolian government.

12 Total project cost of Phase I and II.

3.4.2.2 Project Period

The scheduled project period was 55 months, including a period of detailed design and tendering processes. The actual period was 50.2 months (June, 2005 – September, 2009), shorter than the original plan.

Both the project cost and project period were within the plan, therefore efficiency of the project is high.

3.5 Sustainability (Rating: ②)

3.5.1 Institutional Aspects of Operation and Maintenance

Road Maintenance Companies, Baganuur AZZA (Section II) and HARGUI (Section VI), are in charge of the O&M of the target road, bridges and equipment as shown in table 5. The major role of the Ministry of Road and Transportation for O&M is to formulate policies and plans for the road sector, and allocate a budget.

Table 5 Role of Each Institution on O&M for the Road and Bridges

Institution	Role
Ministry of Road and Transport	Formulation of policy, strategy and plans, Identify the sections of rehabilitation, Allocation of budget
Road Maintenance Companies	Maintenance of road, Preparation and submission of lists of sections requiring rehabilitation, Inspection and maintenance of road and bridges

Through the interview survey of staff of Baganuur AZZA and HARGUI, no major issue in terms of staff shortages have been identified. In Mongolia, maintenance works are made in spring and summer since it cannot be done in winter. In case the number of workers is not sufficient, both road maintenance companies hire workers on a contract basis during summer, thus no critical issues were confirmed. On the other hand, the maintenance department and Road Supervision and Research Center of the Ministry of Road and Transportation as well as the Mongolian Road Association, which provides training courses for road construction, explained that a lack of technical staff is a common issue in Mongolia as a whole, though currently the number of workers is sufficient. In fact, the required number of operators is not allocated in HARGUI as shown in Table 6.

Table 6 Number of Staff of National Road Maintenance Management Agency (Baganuur AZZA and HARGUI)

Category	At the time of planning		At the time of ex-post evaluation(2012)	
	Tuv AZZA	HAGURI	Baganuur AZZA[13]	HARGUI
Operators	17	24	5	8
Drivers	7	9	10	12

Source: Prepared based on a B/D report and document provided by Baganuur AZZA and HARGUI

3.5.2 Technical Aspects of Operation and Maintenance

Baganuur AZZA and HARGUI, which are in charge of the O&M of the road, bridges and equipment, recognizes that there are no issues in the capacity of technical staff, thus the road condition has been kept in good condition. Technical staff for both road maintenance companies learned how to maintain asphalt paved road, where they used to have less experience, and how to utilize and maintain procured equipment for O&M through the practical trainings conducted as a soft component of the project. Thanks to those trainings, they enhanced their capacity, and the skills and experiences acquired have been fully utilized for O&M under the current circumstance. One concern for the future is that there are no opportunities for those technical staff to receive training regarding O&M in the Ministry of Road and Transportation. Though Mongolian Road Associates provided paid training courses[14], chances to take this training is very limited for staffs of AZZA or HARGUI, which have a limited budget. There are no critical problems under the current circumstances, however a certain level of support in technical or financial aspects would be required if new technical capacities became necessary for O&M on new road or equipment in the future.

3.5.3 Financial Aspects of Operation and Maintenance

O&M budget for the road and bridges in Mongolia, which had been decreased both at the time of project planning and after, increased drastically in 2013 as shown in table 7. O&M costs for the target road and bridges was estimated at approximately 1% of the annual road O&M budget of the executing agency, therefore it was expected that an appropriate budget would be secured without problems according to the estimation at the time of planning. Both Baganuur AZZA and HARGUI, however, have not secured adequate amounts of budget as shown in table 8 due to the increase of the O&M cost for these years. In interviewing accounting and O&M staff of both companies, they state that they report information on sections needing O&M to the

[13] At project planning, Tuv AZZA was planned to be the responsible entity for O&M of section II. However, it was divided to three maintenance companies including Ulaanbaatar Azza which is in charge of road of Ulaanbaatar, Erdenesant AZZA, for western area of Tuv Province and Baganuur AZZA for the eastern area of Tuv Province which covered section II of the project. The number of staff at the time of planning in Table 6 indicates the numbers of Tuv AZZA before division.

[14] Training provided by the Mongolian Road Association is mainly for road construction or management, thus O&M for road or equipment are not included at present. The Mongolian Road Association, however, is now considering putting road maintenance in the future curriculum.

Ministry of Road and Transportation every year, however, only 20 or 30% of the needed amount has been allocated.

Table 7 Annual O&M Budget on Road and Bridges of the Ministry of Road and Transportation

(Unit: Million tugrik (Tg))

At the time of planning(2010)	2011	2012	2013
14,000	10,000	11,200	19,000

Source: Documents provided by Ministry of Road and Transportation

Table 8 Annual O&M Budget of the Road Maintenance Company[15]

(Unit: Million Tg.)

	2012	2013
Baganuur AZZA	314.2	500.0
HARGUI	802.9	1079.9

Source: Documents provided by Baganuur AZZA and HARGUI

3.5.4 Current Status of Operation and Maintenance

【Current condition of roads and bridges】

Target roads and bridges are in good condition when conducting actual observation at the ex-post evaluation. There were some cracks on the road surface in section VI, but it was confirmed that HARGUI has already started the maintenance works for these damaged parts from spring, 2013.

Though the B/D report pointed out that an overlay[16] should be done once every seven years, only three years have passed since the road development. Thus, inspection and minor maintenance are required under the current circumstances as shown in table 9. When reviewing the checklist of inspection of each road maintenance company at ex-post evaluation, the specified works have been carried out as planned. Basically those

Table 9 Items to be Inspected for Maintenance

	Facility	Maintenance and Repairing Works
Road	Road surface	Inspection , patching and smoothing
	Shoulder and slope	Surface treatment, vegetation, additional embankment
	Side drainage	Removal of earth deposit
	Marking	Repainting
	Culvert	Repair of crack, stripping and join
Brides	Drainage pipe	Cleaning of sediments
	Expansion joint	Repair of damaged members
	Handrail	Repairing damages by traffic accidents
	Bearings	Removal of earth deposit
	RC slab and curb	Repair of crack and stripping
	Pavement	Repair of crack and potholes
	Main structure, floor system, Lateral bracing	Repair of damaged members
	Substructure	Repair of crack and stripping
	Revetment	Repair of scours

[15] O&M costs for the target sections were estimated at the time of project planning. In the ex-post evaluation, the O&M budget for the target road was not able to be counted accurately, thus the total O&M budget of each company was shown.

[16] Overlay means that only the surface is improved without replacing the roadbed when cracks were caused on the surface and they do not affect the roadbed.

maintenance works are conducted during spring and summer since those works normally cannot be made in the winter season in this country.

However, one concern of possible damages caused by overloaded vehicles has been noted. In the eastern arterial road, there is no regulation on overloaded vehicles except for the Kherlen Bridge. Even there, no controls for measuring the weight of vehicles has been enforced. Therefore, occasionally overloaded trucks will cross carrying massive amounts of building materials from Ulaanbaatar to regional areas or carrying coal from Baganuur which is famous for its coal complex[17]. Overloaded vehicles may hurt the road condition in the future, thus countermeasures to control heavily loaded vehicles is one of the challenges to maintain the sustainability in the future.

【Condition of procured equipment】

Procured equipment has been operated and maintained by Baganuur AZZA and HARGUI. Equipment has been fully utilized for O&M works, but problems with regards to spare parts for some equipment not being available in Mongolia or too expensive to purchase, have been raised by both road maintenance companies. In case spare parts are not available, it is unclear whether those spare parts are available in Mongolia because manufacturers or agents do not deal in the relevant spare parts. At ex-post evaluation, agents in Ulaanbaatar who were designated in a list prepared by the consultant were contacted and it was clarified that these agents did not deal in the specified spare parts, thus it can be said that there is some misinformation in the list prepared by the project. Due to the lack of spare parts, some equipment is currently out of order.

Equipment which is not being utilized now due to this issue is: a pickup truck, a cargo truck with crane, a vibratory rammer and a dump truck. Also for the crusher plant procured for HARGUI, spare parts for a corn crusher made in China, available in the market at Ulaanbaatar, has been substituted since the genuine product was not available in Mongolia. According to the engineer of HARGUI, it is a big concern that the use of spare parts which are not the genuine products may damage the crusher plant itself.

Thus, some problems have been observed in terms of budget for O&M and availability of spare parts of equipment, therefore sustainability of the project effect is fair.

[17] Based on Interview survey at the Baganuur district office and beneficiary survey.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project was conducted to develop two of the six sections in the "Millennium Road Plan" which was formulated by Mongolia to enhance the quality of life in the region through the development of east-west transportation. Thus, as the project meets the needs and development policy of Mongolia and was consistent with Japanese assistance policy, its relevance is high. Since both project cost and period were within the plan, its efficiency is also high. By developing the road and bridges, the quantitative effects of decreasing travelling time on the target road, removing weight restrictions on bridges and increasing the traffic amount have been confirmed. Also mitigating the adverse impacts of a loss of grassland, reducing maintenance costs and securing better access to major cities were identified as qualitative effects. Furthermore, upon the project's completion, the standard of living has been improved through effects such as the lowering of prices and an increase in the number of shops in towns alongside the target road, hence the effectiveness is high. Although the road and bridges are well maintained under the current circumstance, minor concerns in terms of securing a budget and spare parts for equipment needed for maintenance works remain, thus the sustainability is fair.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

【Strengthen O&M of the eastern arterial road as a whole】

Under this project, two of the six road sections, which connect the capital city of Ulaanbaatar in Tuv province with Undurkhaan (Khentii Province) and the major cities of the eastern region, were rehabilitated or developed. Although two target sections have been in good condition, some cracks on the road surface were confirmed in some parts of other sections which disturb smooth transportation. In the arterial road, if there are damaged sections, even in limited parts, it will disturb the effect of smooth transportation as a whole, therefore, O&M not only for the target sections by road maintenance companies but also for the eastern arterial road as a whole will be taken care of based on the plan by the Ministry of Road and Transportation.

【Strengthen the control of overloaded vehicles】

At the time of ex-post evaluation, no weight restrictions had been enforced in the eastern arterial road except at the Kherlen Bridge of Section II. This allows overloaded vehicles to frequently drive between Ulaanbaatar and major cities in the eastern region. The executing agency also recognized the issue on heavily loaded vehicles, therefore, measurement equipment has been set at the Kherlen Bridge and a plan to control the overloaded vehicles is now being prepared. On the other hand, strengthening the control of heavily loaded vehicles only at

Kherlen Bride cannot regulate the vehicles which pull into the eastern road before and after the Kherlen Bridge. Therefore, measures to strengthen the regulations for heavily loaded vehicles at not only Kherlen Bridge but also at major cities such as Baganuur, where many vehicles merge, are needed.

【Supplying the spare parts of procured equipment】

Both Baganur AZZA and HARGUI have issues in getting the spare parts for equipment for O&M, and some equipment is out of order due to the supplying route of spare parts being unclear, or the price of spare parts being too expensive. Although the executing agency explained that the O&M of equipment is totally under the responsibility of road maintenance companies, it is necessary for the Ministry of Road and Transportation to attempt to figure out the supplying route as an executing agency in the case of maintenance companies not being able to manage these issues.

4.2.2 Recommendations to JICA

【Follow up for replacing the spare parts for the procured equipment】

Regarding the issue which was mentioned above in "Supplying the spare parts of procured equipment" of "4.2.1 Recommendations to the Executing Agency", it is recommended that JICA also provide support for establishing the supply route of spare parts for equipment by contacting business agents, manufacturers or suppliers in case the executing agency cannot deal with the issue.

4.3 Lessons Learned

【Arrangement of spare parts】

As mentioned, there's concern on the sustainability in terms of spare parts for equipment. In both Baganuur AZZA and HARGUI, some equipment needed for O&M are out of order since they cannot figure out a supply route for spare parts. Also concern remains that a substitute product which is not the genuine product can damage the equipment itself in the future. The main reason for this issue is that the spare parts are not available at the specified agents which had been designated in the list prepared by the project in Mongolia. In similar type projects, it is necessary to scrupulously prepare a list of supply routes for each spare part to avoid such issues.

(End)

Independent State of Samoa

Ex-Post Evaluation of Japanese Grant Aid Project
"The Project for Construction of the Inter-Island Ferry"

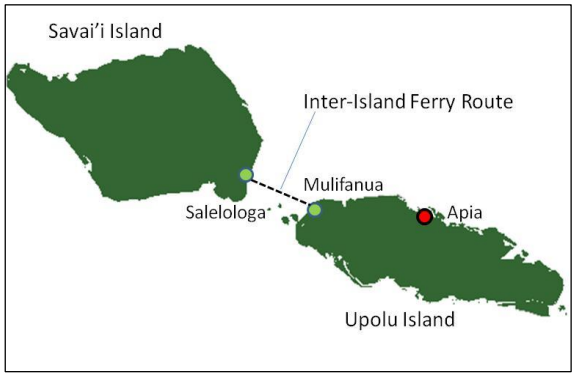
External Evaluator: Keisuke Nishikawa
Ernst & Young Sustainability Co., Ltd.

0. Summary

A passenger-cargo ferry was constructed under this project to ensure safe and stable maritime transportation between Samoa's two main islands of Upolu and Savai'i. This project, supporting a stable traffic flow between the islands, has been consistent with the development policy and needs of Samoa; both at the time of project planning and ex-post evaluation. It was also consistent with Japan's ODA policy; therefore the relevance of this project is high. The effectiveness and impact of the project is also high as it was observed that safe and stable operation services have been underpinning the demand for traffic between the two islands, and that the ferry has played a certain role in the development of Savaii as one of the key infrastructure facilities. The efficiency of the project is high as the project was implemented smoothly with both the project cost and period mostly as planned. With regard to sustainability, while no issues were identified relating to the organizational structure, maintenance conditions and financial conditions, some concerns emerged in terms of constant securing of technicians for maintenance activities.

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

1. Project Description



Project Location

A ferry provided under the project
(Lady Samoa III (LS3))

1.1 Background

A ferry linking the two islands of Upolu (where the capital is located) and Savai'i (the largest island in Samoa) plays an important role in stimulating the Samoan economy as a major artery for visits of people and distribution of goods. For residents of Savai'i, the ferry is a vital lifeline as a basic means of transport. In 2006/07, the ferries carried a total of 620,000 passengers and 60,000 vehicles.

The Samoa Shipping Corporation Limited (SSC), in charge of maritime transportation in Samoa, had four vessels, and the MV Lady Samoa II (LS2), one of the major ferries running between the two islands, came into service in 1988 under Japan's grant aid. In 2006, it carried 66% of all passengers and 58% of all vehicles. In the same year, passenger occupancy exceeded 100% in 85 cases.

However, the ferry was already old and deteriorating. On average, its services had to be cancelled 67 times a year due to unexpected problems, totalling approximately 14 days. Repair costs were rising year by year and there were also safety issues, which saw it become an increasingly unstable means of inter-island transport. Since transportation demand was forecast to continue growing in the future with the development of Savai'i, it was important to find a stable solution to this growing demand.

Based on the background above, this project was implemented as a grant aid project to provide a replacement vessel for LS2.

1.2 Project Outline

The objective of the project was to ensure safe and stable maritime traffic and transportation by providing a ferry to operate between Upolu and Savai'i Islands.

Grant Limit / Actual Grant Amount	1,319 million yen / 1,318 million yen
Exchange of Notes Date	June, 2008
Executing Agency	Samoa Shipping Corporation Limited
Project Completion Date	February, 2010
Main Contractor	ISB Co., Ltd. (Construction)
Main Consultant	Fisheries Engineering Co., Ltd.
Basic Design	May, 2008
Related Projects	<u>Technical Cooperation:</u> [Expert] Marine Engineering (4 experts, 1990-2003) Operation Management (Short-term, 2006) [Senior Volunteer (SV)] Ferry Maintenance (Electric/Electronic,

	2003-2005) Marine Engineering (3 volunteers, 2003-2013) [Japan Overseas Cooperation Volunteer (JOCV)] Marine Engineering (1987-1989) Electrical Engineering (5 volunteers, 1987-2000) <u>Grant Aid Projects:</u> - Domestic Transportation Strengthening Project (1984-1985) - The Project for Building the Inter-Island Passenger/Vehicular Ferry Boat (1987) - The Project on the Development of Apia Port (1988-1989) - The Project for Rehabilitation of Cyclone-damaged Ports and Construction of Quarry Plant (1990-1991) - The Project for Rehabilitation of Cyclone-damaged Ports and Apia Harbour Revetment (1992-1993) - The Project for Construction of the Inter-Islands Navigation Vessel (1997) - The Project for Construction of a Tugboat for Apia Port (2000) - The Project for the Second Development for Apia Port (2001-2003)

2. Outline of the Evaluation Study

2.1 External Evaluator

Keisuke Nishikawa (Ernst & Young Sustainability Co., Ltd.)[1]

2.2 Duration of Evaluation Study

This ex-post evaluation study was conducted with the following schedule:

Duration of the Study: November 2012 – November 2013

Duration of the Field Study: April 12 – 26, 2013

[1] Joined the evaluation team of Ernst & Young Sustainability as a team member from Japan Economic Research Institute Inc.

3. Results of the Evaluation (Overall Rating: A[2])

3.1 Relevance (Rating:③[3])

3.1.1 Relevance with the Development Plan of Samoa

Since 2002, Samoa has been formulating a national development plan, the 'Strategy for the Development of Samoa (SDS)', every three to five years. In the 'SDS 2005 – 2007', effective during project planning, enhancement of maritime transport connecting the two islands of Upolu, which was the main island, with three quarters of the country's population, and the largest island of Savai'i, was listed as a development challenge.

In the SDS 2012 – 2016, effective during ex-post evaluation, upgrading and maintenance of port facilities as well as other related services are regarded as one of the strategic areas although no direct reference has been made to the development of additional ferries. Accordingly, it can be considered that a stable maritime transport between the two islands has been a development agenda in a broad sense.

In light of the significance of transport infrastructure in the island state of Samoa, the SDS 2012 – 2016 also specifies the development and implementation of a Transport Sector Plan as another key strategic area. The Plan was being formulated during ex-post evaluation; mainly by the Ministry of Works, Transport and Infrastructure[4].

Thus, this project has been relevant to the development policy of Samoa as the importance of maritime transportation has been consistently stated in its development strategies; both during project planning and the ex-post evaluation.

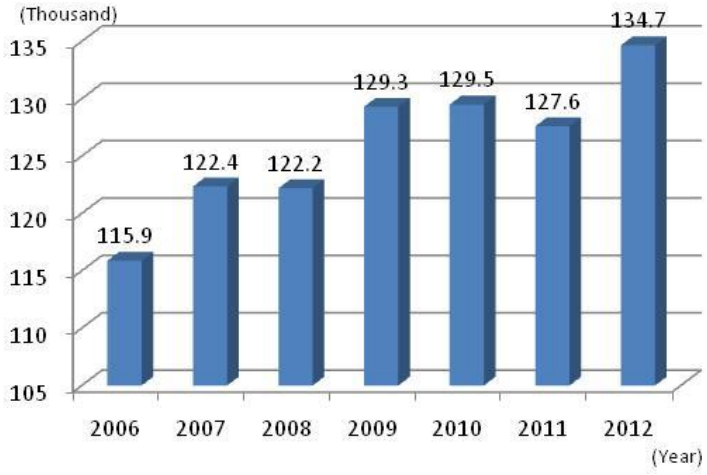
3.1.2 Relevance with the Development Needs of Samoa

In 2007, flows of people and goods were estimated to increase since the development of Savai'i, the development status of which was poor compared to that of Upolu where the capital is located, was deemed a key challenge, and tourism and commercial land were being developed there. Reflecting this increase, the demand for inter-island ferries was expected to increase. However, the only means of transport between the two islands had become increasingly unstable given the aging main ferry, the LS2, and an annual average of 14 days and 67 services had to be cancelled due to sudden breakdowns.

In Samoa, the tourism industry is one of the engines for economic growth, as indicated in the number of tourists reaching over two-thirds of the country's population (187,000)[5]. The number of tourists, as shown in the figure below, has remained steady,

[2] A: Highly satisfactory, B: High, C: Partially satisfactory, D: Unsatisfactory
[3] ③: High, ②: Fair, ①: Low
[4] According to the Ministry, the formulation of the Plan will be completed by the end of 2013.
[5] Based on the 2011 Census data. 76% in Upolu and 24% in Savai'i

despite decreases recorded in some years.



Source: Data from the Samoa Bureau of Statistics and Samoa Tourism Authority

Figure 1: Number of Tourists visiting Samoa

As described in '3.2 Effectiveness', passenger and vehicle traffic on the ferries linking Upolu and Savai'i decreased following the 2008 Lehman Crisis but has recovered since FY2009/10. According to a beneficiary survey[6] of 100 passengers on the Lady Samoa III (LS3), provided under this project, half the respondents make more than six trips on the ferries, showing that the service is an important means of transport and frequently used by Samoan residents in addition to foreign tourists. In sum, ferry services between the islands have played a key role as a fundamental means of transport to meet the needs of tourists as well as local residents. Accordingly, demand from the people can be considered consistently high.

In 2012, air services between the two islands were introduced by Samoa Air[7], but the impact on demand for maritime transport is considered minimal, given the very low passenger numbers and the fact that most use ferries to cross the strait.

3.1.3 Relevance with Japan's ODA Policy

When this project was being planned, the Japanese cooperation in Samoa focused on five key areas based on the priority areas of Japanese assistance declared at 'The Fourth

[6] An interview survey with 100 passengers on LS3 was conducted. 64% of the respondents were Samoan residents and 36% non-residents. The main questions concerned the ferry's physical and service improvement, safety, reliability, effects on local economies, tariff, maintenance conditions, etc.

[7] Fares on Samoa Air flights are based on the weights of the passenger and baggage and normally several times higher than the ferry fare. Therefore, the disparity is estimated to have limited any major competition between ferry and air services. (Samoa Air's passenger data were undisclosed at the time of the ex-post evaluation survey.)

Pacific Leaders' Meeting' between Japan and the members of the Pacific Islands Forum held in May 2006. This project was in line with one of the key areas, 'Social infrastructure development: assistance to transportation infrastructure and electricity projects', and was expected to contribute to 'Income generation: strengthening agricultural and fisheries sectors, development of domestic industries (development of tourism and local industries)'. In this way, this project can be judged to have been consistent with Japan's ODA policy at the time.

This project has been highly relevant with Samoa's development plan, development needs, as well as Japan's ODA policy; therefore its relevance is high.

3.2 Effectiveness[8] (Rating:③)

3.2.1 Quantitative Effects

3.2.1.1 Achievement of Stable and Safe Operations

It had been expected that implementing this project would reduce service cancellations of and eliminate overcrowding on ferry services that was becoming increasingly problematic during project planning. Incidents of service cancellations and excessive passenger numbers during the project planning and ex-post evaluation were as shown in the table below.

Table 1: Improvement in Ferry Operations

Item	During planning in 2006	Target figure in 2011	Actual figure during ex-post evaluation
Reduction in the number of cancellations due to sudden breakdowns	Approx. 14 days, 67 services	Several days, several services	None (2011) None (2012)
Elimination of services with excessive passengers (annual number)	85 services (4.7% of all services)	None	16 services (2011) 10 services (2012)

Source: Basic Design Report and the Data provided by the Executing Agency

104 services in 25 days were cancelled due to sudden breakdowns caused by initial engine troubles in 2010, soon after LS3 was provided, although these troubles were fixed under warranty by the supplier. Following these initial troubles, ferry operations remained continually stable without any cancellations due to sudden breakdowns in 2011 and 2012[9]. In the beneficiary survey, 84% of the respondents

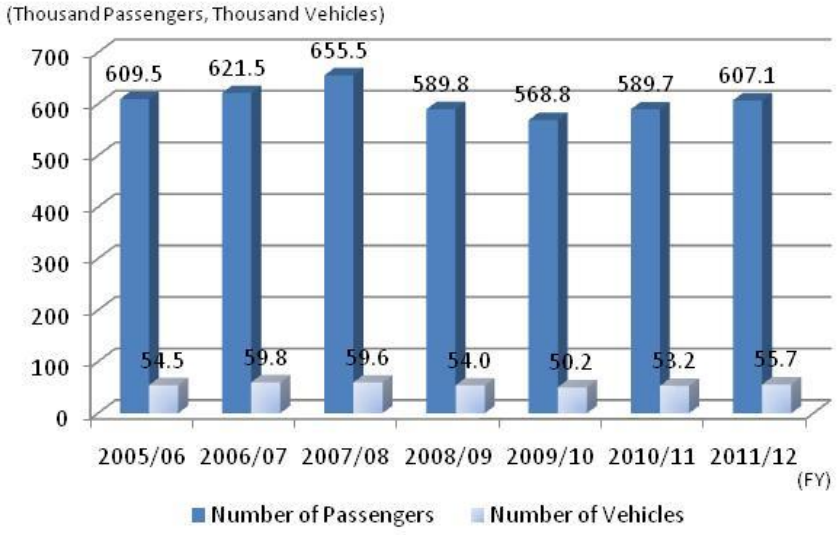
[8] Sub-rating for Effectiveness is to be put with consideration of Impact.
[9] Excluding the number of services by other vessels due to regular inspections and cancellations caused by

indicated that LS3 was operated more reliably compared to the former LS2 ferry.

The full complement is set with the objective of securing passengers' safety. As life vests and life-saving rafts are installed in accordance with the complement, excessive passengers onboard would be a safety issue. However, such services were seen even during the ex-post evaluation, following the cancellations of previous services and also during peak season (e.g. Christmas). While the number of such services decreased substantially from 85 recorded during planning, it has yet to reach the target of zero, set during the planning stage. However, the proportion of services with excessive passengers declined to 1.07% in 2011 and 0.58% in 2012 on LS3 while the corresponding figure was 4.7% in 2006 on LS2.

3.2.1.2 Number of Passengers and Vehicles

In addition to the expected project effects, the number of people and vehicles travelling was expected to increase as the Savai'i Island became more developed. In this survey, data of some basic indicators such as the operation of ferries, number of passengers and vehicles were collected as indicated below.



Source: Data provided by the Executing Agency

Figure 2: Number of Passengers and Vehicles between Upolu and Savai'i Islands

Although the number of passengers and vehicles on the four ferries travelling between Upolu and Savai'i Islands increased steadily, they hovered at a lower level between 2008 – 2010 due to the slowdown of the global economy caused by the Lehman Crisis in 2008, before rising again in FY2010/11. During the same period,

bad weather conditions

GDP growth in Samoa was -3.7% in 2008, -1.4% in 2009, 2.1% in 2010, 1.2% in 2011 and 0.8% in 2012 respectively. The flow of people and vehicles on the ferries showed a similar trend. By providing LS3, the ferries operating between the two islands can be said to have stably underpinned all these traffic demands.

The operation records of LS2, previously the main ferry, and that of LS3, currently the main ferry, are summarised in the following table:

Table 2: Operation Record of LS2 and LS3

Vessel	LS2			LS3	
FY	2004/05	2005/06	2006/07	2010/11	2011/12
Operating Days	336	353	340	343	360
Number of Services	1,812	1,877	1,814	1,495	1,738
Number of Passengers	361,080	386,698	381,175	399,170	425,300
Number of Vehicles	31,321	30,897	32,538	33,968	37,212

Source: Data provided by the Executing Agency

While this project was not expected to generate new demand directly, the number of passengers and vehicles on LS3 in FY2010/11 was planned at 109.7% and 115.3% respectively, compared with the records of LS2 in FY2006/07. The actual performance shown in Table 2 indicates that the passenger and vehicle traffic numbers were 104.7% and 104.4%, namely below the planned volume. However, LS2 is still utilised as a backup vessel when other vessels, including LS3, undergo periodical inspections and/or need repairing, or during the peak season, which means that the operations undertaken only by LS2 previously are now mainly done by LS3 but still supported by LS2. Therefore, the comparison of the performance of the past LS2 and that of the current LS3+LS2 reveals that the figures are 112.4% for passengers and 113.4% for vehicles. With these figures, it can be considered that the figures for passenger and vehicle traffic in FY 2010/11 have generally been as expected.

Photo 1: Main Cabin (lower level)

Photo 2: Vehicle Deck

Photo 3: Business Class Cabin

3.2.2 Qualitative Effects

While no qualitative effects of this project were expected during planning, the satisfaction level of passengers in business class was examined as the business class cabin was newly established on the LS3 in addition to the economy class cabin. The summary of the responses were:

- 83% of the passengers who had used business class (a total of 72 passengers) replied that it was more comfortable than the LS2 cabin.
- Regarding the balance between the business class fare (over three times that of economy class) and comfort, 38% said that it was 'very cost-effective' and another 47% considered it 'reasonable'.

These results indicate that more than 80% of the respondents were generally satisfied with the balance between cost and comfort. It is assumed that the introduction of business class has been effective to some extent.

3.3 Impact

3.3.1 Intended Impacts

An impact of this project estimated during planning was that the industrial and tourism development in Savai'i would be promoted so that the cash-earning opportunities would increase and the standard of living would be improved.

In Samoa, tourism revenues have been moving at a level slightly exceeding three hundred million Tala since reaching this figure in 2009. This amount comprises over 20% of GDP and the expenditure per tourist in 2011 is 2,500 Tala on average[10].

While no data on the tourist number and revenues specific to Savai'i were available, a beneficiary survey of the passengers on LS3 showed that 58% were feeling socioeconomic changes in Savai'i, especially around Salelologa, which were attributed to increased commercial activities and tourist numbers. Interviews with the owners of the market stalls, shops and hotels in Salelologa also revealed that transportation of more passengers and vehicles were now possible and that there were more visitors to Savai'i.

The development of Savai'i has always been positioned as one of the development challenges as described above, and the Salelologa Market was relocated to an area about two kilometres west of the Salelologa Port several years ago, and developed as a commercial area alongside other facilities. The 'Samoa National Infrastructure Strategic Plan', formulated in 2011, also lists improvements of infrastructure facilities in Savai'i, including the development of Salelologa Port.

In the ex-post evaluation survey, no concrete examples in which stable ferry

[10] 1 Samoan Tala was about 42 Japanese Yen (as of July 2013).

operations induced socioeconomic changes or generated increased passenger and vehicle traffic were observed. However, passengers and local businesses felt that their business activities were more vibrant and there were more visitors to Savai'i, indicating that LS3 played a role in stably underpinning these changes as one of the key infrastructural facilities.

3.3.2 Other Impacts

3.3.2.1 Impacts on the Natural Environment

It was anticipated that the ferry to be provided would be more environmentally-friendly than LS2, thanks to adopting a fuel-efficient system and a low NOx emission engine.

The actual ferry provided was equipped with a low NOx emission engine as planned, and it was also confirmed that an oily water separator installed was preventing the discharge of oil. With regard to fuel consumption, while every service of LS2 was consuming 1,753 litres of fuel (average from 2007 – 2009), LS3 consumed an average of 1,582 litres per service (2011 – 2012), representing an improvement of approximately 10%. In addition, no negative environmental and social impacts related to the operation of vessels, including the dredging of ports, were observed in the survey.

In light of the above, LS3 has enabled higher fuel efficiency and reduced environmental burdens due to environmental measures taken on its engine. No other negative environmental impacts have been reported, and it can be said that there are no problems or issues associated with this project.

3.3.2.2 Land Acquisition and Resettlement

The ferry provided in this project was constructed at a shipyard in Japan, whereupon it was sailed and handed over to Samoa. This meant neither land acquisition nor resettlement of residents was involved and no related problems have been identified during or after the implementation of the project.

3.3.2.3 Unintended Impact

As briefly described in 'Effectiveness', LS2 is still maintained and utilised even after 2011, when the ferry was thought to have come to the end of its service life. During the ex-post evaluation, the ferry was operated as a backup or charter vessel when other vessels underwent inspections or broke down. With these measures, overall operations between the two islands were stabilised and sufficient time for maintenance and inspection of LS3, a highly reliable ferry, could be allocated,

leading to the achievement of breakdown-free operations. Having noted that, certain measures were considered necessary to determine how stable operation could be continued in the same way, even after the retirement of LS2, given the limited remaining service period.

Photo 5: LS2, utilised as a backup vessel (anchored at the Salelologa Port)

With respect to satisfaction concerning the safety and services of LS3, the beneficiary survey revealed that 91% of respondents had a sense of better safety and no-one responded that operations had become more dangerous. In addition to most (97%) being positive about their satisfaction with the operation of LS3, 96% were also satisfied with the cabin services. In sum, passenger satisfaction with the operational safety and services was overwhelming.

This project has largely achieved its objectives; therefore its effectiveness and impact is high.

3.4 Efficiency (Rating:③)

3.4.1 Project Outputs

In this project, a passenger/vehicle ferry offering services between Upolu and Savai'i Islands was provided. Based on the main specifications shown in Table 3, the ferry was provided mostly in accordance with the plan.

Table 3: Comparison of Original and Actual Outputs

[Provision of a Passenger/Vehicle Ferry]

	Original	Actual
Complement	752 (Passenger 740, Crew 12)	752 (Passenger 740, Crew 12)
Passenger car carrying capacity	Approx. 37	Approx. 37
Length overall	46.7m	46.7m
Breadth, molded	13.0m	13.0m
Gross tonnage	Approx. 1,000 tons	1,045 tons
Main engine	880kW(1,200ps) * 2 units	880kW(1,200ps) * 2 units

Source: Basic Design Report and Completion Report

Providing LS3 meant the transport capacities of the ferry could be expanded up to 740 passengers (seated economy class: 460, standing economy class: 232, business class: 48)[11] and approximately 37 passenger cars on LS3, both up from 480 (seated economy class: 300, standing economy class: 180) and a carrying capacity of approximately 30 passenger cars on LS2. 90% of respondents in the beneficiary survey also replied that the loading capacity of the ferry had improved.

The project components to be undertaken by Samoa did not include anything related to the construction of the ferry itself but solely the issuance of documents required for the construction and cruising as well as customs clearance procedures upon arrival of the ferry. These procedures were all executed promptly and as planned.

3.4.2 Project Inputs

3.4.2.1 Project Cost

The planned project cost to be borne by Japan was approximately 1,319 million yen. In addition, 1.3 million yen was to be spent by Samoa as banking commission fees.

The following table summarises a breakdown of the planned and actual project costs contributed by the Japanese side:

Table 4: Comparison of Original and Actual Project Costs

(Unit: million yen)

Breakdown	Original	Actual
Construction	1,246	1,227.0
Cruising	22	40.0
Designing and Supervision	51	51.3
Total	1,319	1,318.3

Source: Basic Design Report and Completion Report

The actual project cost was 1,318.3 million yen (Japanese portion), which fell within the planned amount. The banking fees to be borne by the Samoan side turned out to be 36,000 Tala (Approximately 1.26 million yen), which was also within the planned amount.

[11] Unlike LS2, since the armrests between seats are fixed/non-adjustable on LS3, this prevents some passengers from lying down and taking up several seats. The executing agency regards it as a means of increasing the effective space for passenger seats.

3.4.2.2 Project Period

The period of this project was planned at 20.5 months (4.5 months for detailed designing and tender document preparation, and 16.0 months for construction and cruising). The actual project period was 20 months from July 2008 to February 2010, mostly as planned and scheduled. No issues were observed during either the construction or cruising.

Both the project cost and project period are mostly as planned; therefore the efficiency of the project is high.

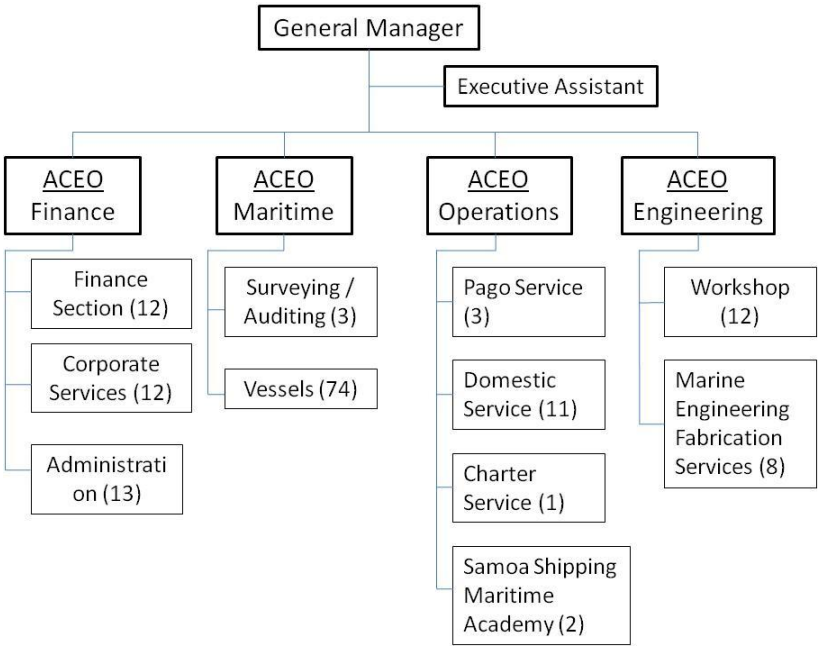
3.5 Sustainability (Rating:②)

3.5.1 Institutional Aspects of Operation and Maintenance

The Executing Agency of this project is the Samoa Shipping Corporation Limited (SSC), which is operating LS3 and a barge-type Fotu-o-Samoa; mainly in charge of cargo transport between Salelologa and Mulifanua on the domestic route[12]. It also has the LS2 (a passenger/vehicle ferry) and Samoa Express (barge-type) as backup vessels.

In terms of organisational structure, SSC has four departments under the General Manager, consisting of 156 staff members, 20 up on the planning period. While the four-department structure has remained unchanged, the main factors behind the increase in the overall number of staff are the new establishment of the 'Samoa Shipping Maritime Academy' and the 'Marine Engineering and Fabrication Services (MEFS)' under the Operations Department and the Engineering Department, respectively, and the increase in the number of staff in the Accounting and Finance Department. The Maritime Department, in charge of the operation of ferries, including the one provided, has an unchanged structure and 74 staff members, 13 of whom are engaged in operating the LS3. The Engineering Department, which is responsible for the maintenance of ferries, has 20 members in total. 12 engineers are allocated to the SSC Workshop for regular maintenance and inspections of the vessels, while an additional eight members are assigned to MEFS, and taking orders from the private sector for specific parts, in addition to the backup function for the required maintenance and inspection of vessels. According to the Executing Agency, the number of staff in charge of maintaining vessels is sufficient.

[12] SSC is operating an international route weekly between Samoa and American Samoa with MV Lady Naomi, a vessel provided under a Japanese aid project in 1997.



Source: Information Provided by the Executing Agency

Figure 3: Organisational Structure of the Samoa Shipping Corporation Limited

Compared to the planning period, SSC has expanded its activity areas, e.g. by establishing a maritime school and a section to fabricate specific parts, but no negative impact was observed. The staff members for LS3 and the Workshop seem to have been secured and a smooth operation and maintenance system looked well-established during the site visit.

3.5.2 Technical Aspects of Operation and Maintenance

During project planning, the Executing Agency already had more than 30 years of experience in maritime transport, and was certified in 1998 with the International Safety Management system (ISM) for its offices and vessels by the Lloyd's Register of Shipping. Also, thanks to more than a decade of technical assistance provided by Japan, it was judged that they had a certain level of equipment and human resources to facilitate ordinary maintenance and repairs of the ferry provided under this project. During the ex-post evaluation, the operation system in line with the ISM was maintained, passing the annual inspections of the ISM Committee as well as the Ministry of Works, Transport and Infrastructure, which demonstrated that the management had reached a level always certified with an international safety management system.

Concerning the maintenance techniques for the LS3, pre-determined items were checked and repaired accordingly when a quarterly inspection was visited during the

ex-post evaluation survey. It is presumed that, coupled with the fact that no serious problems affecting operation have occurred, the engineers have a certain capacity to conduct inspections and repairs. To develop the engineers' capacities, in addition to OJT (On-the-Job-Training), some are taking vocational training courses such as fitting/machining and welding classes provided through an Australian aid project at the Institute of Technology of the National University of Samoa (NUS-IoT). The Executing Agency also established the Maritime Academy in 2013 and started implementing a half-year practical course targeting graduates of NUS-IoT, which included providing practical sessions on inspecting and cleaning LS3. In this way, the Executing Agency is trying to train technicians and engineers by itself.

Despite these efforts, SSC's in-house engineers cannot necessarily deal with all the repairs unaided. According to a senior volunteer from Japan, instructions by highly-skilled external experts are still needed in the fields of electricity, electronics and marine engineering. While Japan has provided technical assistance by dispatching experts and senior volunteers since the 1990s, there were several cases where the technicians and engineers who had acquired certain knowledge and skills left their jobs to migrate overseas, leading to a lack of accumulated technology within the corporation. Therefore, it is assumed to be particularly necessary to develop the capacities of several engineers in the same field so that the skills will be systematically improved and transferred.

3.5.3 Financial Aspects of Operation and Maintenance

The Executing Agency is a financially-independent corporation without any government subsidies, but has operated in the black for more than a decade. Part of the surplus has been accumulated in the Vessel Replacement Fund (VRF) since 1999, as agreed between the governments of Japan and Samoa when it was decided that the next vessel after LS3 would be covered by the accumulated reserves in this fund, based on the project implementation.

The following table shows the annual operational incomes and expenditures of the Executing Agency after FY 2005/2006:

Table 5: Operational Income and Expenditure of All Vessels

(Unit: thousand Tala)

FY	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Revenue from Operation	14,132	13,648	13,741	16,085	18,602	22,628	23,501
Direct Expenses	8,407	8,551	8,896	10,243	9,798	14,999	15,645
Operational Profit	2,881	2,099	4,844	5,842	8,803	7,930	7,856
Profit after Tax	1,523	657	154	1,389	4,372	3,045	2,199
Accumulated Profit	4,815	5,471	5,067	6,457	10,829	13,873	16,071
Transfer into VRF	1,169	712		115	1,181	724	86
Accumulated VRF	2,508	3,220	2,341	2,456	3,637	4,361	4,447

Source: Data provided by the Executing Agency

As shown in the above table, the operational profit has been steady every year, leading to a rise in the accumulated profit of the Executing Agency. Part of the profit is transferred into the VRF, which has been gradually growing thanks to sound financial conditions. A decrease in the balance of the fund from FY 2006/07 to FY 2007/08 was due to the purchase of a cruise ship 'MV Lady Filifilia', covered by part of the fund. As transfers into VRF were always made in all other years, the balance as of the end of FY2011/12 was 4.45 million Tala (ref: 1.8 million yen). To purchase the next ferry entirely by accumulated reserves in the VRF, however, the pace of transfer to date will be unable to cover all the costs and an annual transfer exceeding one million Tala will be needed. However, the Executing Agency said that the government had yet to determine how the financing would be arranged 25 years later and also how much of the profit would be accumulated for that purpose.

The revenue from operation has recently shown a steady increase, supporting sound management of the Executing Agency. One of the main factors is a 33% hike in adult fares backed by the rise in fuel prices, compared to the project planning period. However, this 33% hike is considered reasonable, since the consumer price index in 2012 was 28% higher than that in 2007. In the beneficiary survey, 4% of the respondents said that the fare was cheap, and 64% considered it 'reasonable', suggesting that a fair level had been maintained as a public means of transport.

The above is the overall financial conditions of the Executing Agency, and Table 6 shown below summarises the balance of LS3, provided in this project.

Table 6: Operation Balance of LS2 and LS3

(Unit: thousand Tala)

	2007	2011		2012
	LS2 (Actual)	LS3 (Plan)	LS3 (Actual)	LS3 (Actual)
Revenue from Operation	5,623	6,295	7,596	8,736
Expenditure from Operation	3,325	3,155	3,410	3,788
Balance	2,298	3,139	4,186	4,949

Source: Data provided by the Executing Agency

During project planning, an operational profit of 3.13 million Tala was expected for 2011, but the actual figure proved to be much higher at 4.19 million Tala. It rose even further to 4.95 million Tala in 2012, supporting the bread and butter of the Executing Agency's sound management. While revenue has increased steadily, it can be observed from the above table that expenditure has been curbed as far as possible. One of the contributing factors is LS3 improving fuel consumption by 10% on an actual operational basis compared to LS2.

As above, it has become clear that the financial conditions of the Executing Agency have been sound, enabling the steady transfer of part of the surplus into the VRF, and the LS3 has been a key contributor to it.

3.5.4 Current Status of Operation and Maintenance

The Executing Agency, with its own workshop within the premises of the headquarters, has been conducting all internal maintenance of vessels, apart from dry-docking of the ship bottom. Upon implementing this project, a preventive maintenance programme specifying regular inspections and replacement of parts was formulated in addition to the provision of the ferry. During the site survey of the ex-post evaluation study, it was confirmed that weekly maintenance every Tuesday, quarterly maintenance, and the first dry-docking in American Samoa in 2012 had all been implemented as scheduled. Inside, the ferry was generally kept clean and no problems potentially hindering its operation were identified in the engines.

Photo 6: LS3, anchored in the Apia Harbour for its regular inspection

Photo 7: Inspection of the main engine

Photo 8: Cleaning during the inspection (by the students of the Maritime Academy)

According to the Executing Agency, the main issue in their routine work was the long time and high cost needed to procure spare parts from overseas. Also, as an issue related to '3.5.2 Technical Aspects of Operation and Maintenance', particularly in the fields of electrical and marine engineering, instructions and guidance by external technicians may be needed depending on the level of troubles. However, it is estimated

that the initially expected 25-year service life period will be sufficiently achieved with the continuation of maintenance and cleaning system currently introduced.

In addition to the maintenance condition of the ferry, there were no hindrances to its operation, as the buoys along the route were managed well and the channels were dredged without any problems[13]. Should a problem be discovered, it will be reported to the Samoa Ports Authority.

The beneficiary survey result shows that such maintenance has been favourably regarded by passengers, reflected in the fact that 85% are 'Highly satisfied' or 'Satisfied' and 14% consider the maintenance conditions of LS3 'Reasonable'.

Some problems have been observed in terms of technical aspect; therefore the sustainability of the project effect is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

A passenger-cargo ferry was constructed under this project to ensure safe and stable maritime transportation between Samoa's two main islands of Upolu and Savai'i. This project, supporting a stable traffic flow between the islands, has been consistent with the development policy and needs of Samoa; both at the time of project planning and ex-post evaluation. It was also consistent with Japan's ODA policy; therefore the relevance of this project is high. The effectiveness and impact of the project is also high as it was observed that safe and stable operation services have been underpinning the demand for traffic between the two islands, and that the ferry has played a certain role in the development of Savaii as one of the key infrastructure facilities. The efficiency of the project is high as the project was implemented smoothly with both the project cost and period mostly as planned. With regard to sustainability, while no issues were identified relating to the organizational structure, maintenance conditions and financial conditions, some concerns emerged in terms of constant securing of technicians for maintenance activities.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

4.2.1.1 Training of Maintenance Technicians

As the Executing Agency experienced losses of highly-skilled technicians /

[13] The Samoa Ports Authority is responsible for maintaining buoys and dredging channels.

engineers resigning to migrate overseas and such risk is inevitable, it is essential to improve the environment to minimise the risk of brain drain. Even if it happens, training of several technicians, particularly in the fields of electrical and marine engineering, key to stable operations of the ferry, will be crucial to implement appropriate maintenance and repairs.

4.2.1.2 Constant Accumulation into the Vessel Replacement Fund

After the Vessel Replacement Fund was established at the end of 1990s, some of the profit has been accumulated into the fund. However, it cannot be said that the level of accumulation is sufficient toward the next replacement coming in 20-odd years' time, with only 4.45 million Tala accumulated by the end of FY2011/12. No concrete system has been established by the Executing Agency as to the proportion of surplus to be accumulated into VRF, leading to ambiguous operation of the fund. As the financial conditions improved with the project implementation, a steady and continuous accumulation of an amount sufficient for the next replacement will be important from a long-term perspective.

4.2.1.3 Elimination of Overcrowded Services

Although elimination of overcrowded services was expected through this project, they are still occurring during specific seasons every year, such as Christmas and White Sunday. During those periods, it will be essential to avoid such services by ensuring efficient operations of all existing vessels as well as firmly limiting the number of passengers boarding to ensure the safety of the vessel.

4.2.2 Recommendations to JICA

No recommendations.

4.3 Lessons Learned

Japan has long provided technical assistance, especially in electrical and marine engineering, to improve the capacities and skills of technicians at the Executing Agency. This project was implemented amid these efforts to maintain the ferry in good condition after the provision. Good ferry maintenance and safe operations provided under this project will help ensure the effective use of the vessel for a further extended period, passenger convenience, and also sound management of the corporation. In this respect, a long-term technical cooperation by 'working together' to improve the maintenance capacities of the technicians on marine engines and electrical equipment, essential for the operation of vessels, can be highly regarded as a combination applicable to other similar

projects.

(End)