Country Name	ect for Improvement of Livingstone City Road				
Republic of Zambia	Jeet for improvement of Envingstone City Road				
I. Project Outline					
	In Zambia, roads have played an important role in transporting goods including international logistics				
	major trunk road located at the junction of the route to South Africa by way of Zimbabwe from				

Background	Lusaka and the route to South Africa by way of Botswana. However, after the pavement in the early 1970's, the road surface was only improved through random paving. As a result, about the half of the road was randomly paved and the other half was unpaved. Also, the roads were severely deteriorated due to the increase in heavy vehicles, and the sidewalks and drainage systems were also damaged, which were hindering the economic growth in Livingstone City where the tourism was a key industry.						
Objectives of the Project	To ensure the smooth and safe traffic flow in Mosi O'Tunya Road in Livingstone City, by repairing Mosi O'Tunya Road, in order to promote mobility of goods and human exchanges and improve the access to the tourist area.						
Outputs of the Project	 Project Site: Livingstone City Major Project: Repair of Mosi O'Tunya Road (13.01km) excluding surface layer pavement, etc. Zambian Side: Surface layer pavement, street light removal/relocation, buried pipe depth replacement, buried sewer pipe depth changing, manhole repair, electric line replacement, street light wire lead-in, etc. 						
Ex-Ante Evaluation	2008	E/N Date	July 4, 2008	Completion Date	March 9, 2010		
Project Cost	E/N Grant Limit: 986 million yen, Actual Grant Amount: 982 million yen						
Implementing Agency	Livingstone City Council (LCC)						
Contracted Agencies	Project: Ingerosec Corporation, Tokura Corporation, Zambian contractors: BCHOD (Brian Colquhoun, Hugh O'donnel and Partners), INYATSI (INYATSI Roads-Zambia)						

<Constraints on Evaluation>

- After the project was completed, several problems including flow ruts were found in the defect inspection survey and the full-scale repair (removal of the surface layer and repavement) was conducted by the Government of Zambia. The repair work was completed on September 30, 2013 and the amount borne by the Zambian side was about 500 million yen (unspecified). Since the repair work was conducted after the project completion, this period and cost were not considered for verification of the project efficiency of this ex-post evaluation. However, for the analysis of the data and information, it was not possible to separate the repair work conducted by the Zambian side from the grant aid project, and therefore the verified effects and impacts are attributed to both the project and work conducted by the Zambian side.

II. Result of the Evaluation

1 Relevance

<Consistency with the Development Policy of Zambia at the time of ex-ante and ex-post evaluation>

The project has been consistent with Zambian development policies, as maintenance and improvement of the road infrastructure has been prioritized in the "5th National Development Plan 2006-2010" and "6th National Development Plan 2010-2015."

<Consistency with the Development Needs of Zambia at the time of ex-ante and ex-post evaluation>

Mosi O'Tunya Road has been regarded as an important trunk road for economic and social development of Zambia. However, some part of the road was unpaved and other part was severely deteriorated, and there have been needs for repair and maintenance of the roads. <Consistency with Japan's ODA Policy at the time of ex-ante evaluation>

The project was relevant with the "Country Assistance Program (2002)", in which one of the priority areas was support for the efforts for establishing the balanced economic structure. Related to this, infrastructure development was regarded as the base for economic activities.

<Evaluation Result>

In light of the above, the relevance of the project is high.

2 Effectiveness/Impact

< Effectiveness>

The project has partially achieved the objective "to ensure the smooth and safe traffic flow in Mosi O'Tunya Road." One indicator is the average travel speed. According to the data provided by Livingstone City Council (LCC), the average travel speed in Mosi O'Tunya Road (except the urban areas) was below the plan in the target year (2010), but reached the plan in 2014 (Table 2). The reasons for not achieving the target in 2010 were not available from LCC. The transit time in 2014 decreased more than by half compared to 2010. Although these figures provided by LCC are estimates because LCC has not monitored the speed or time, direct measurement by the evaluation team (Table 1) also proves that the average travel speed increased more than planned.

Table 1. Average travel speed in Mosi O'Tunya Road (km/h)					
Section	2010	2015	2015		
	Target	Actual	Actual		
		(8:00	(17:00		
		-9:00)	-18:00)		
Water tank - Airport Rd.	40-50	50-60	45-60		
Airport Rd Shoprite Intersection		40-45	35-50		
Shoprite Intersection - Railway		50-60	50-65		
Pass					
Railway Pass - Courtyard Hotel		60-70	55-70		
Courtyard Hotel - Victoria Falls		80	70-80		
Water tank - Airport Rd. Airport Rd. – Shoprite Intersection Shoprite Intersection – Railway Pass Railway Pass – Courtyard Hotel Courtyard Hotel – Victoria Falls	40-50	-9:00) 50-60 40-45 50-60 60-70 80	-18:00) 45-6 35-5 50-6 55-7 70-8		

Source: Direct measurement by the evaluation team (July 2015). The results are the average of weekday and weekend measured figures.

The other indicator is the number of the traffic accidents. The number of the traffic accidents at night per year in the area with the street lights remained same after the project completion until 2013 but it slightly increased in 2014. The reason for this increase was not available from LCC. According to LCC and the traffic police, the traffic safety has been improved during the day time, as the motorists now do not have to avoid the pot holes and can move smoothly, although the traffic accidents have increased in the whole district. The Road Traffic and Safety Agency and police officers carry out patrols and monitor the drivers' compliance. Also, the safety of the pedestrians and bicycle riders been improved thanks to the improved shoulders and sidewalks separated from the roads, according to the interviewed pedestrians. <Impact>

First, as a result of the repaired Mosi O'Tunya Road, the traffic volume has increased, according to the Road Development Agency (RDA) and LCC. This change is also attributed to the increased number of shops and restaurants in the area. Secondly, truck drivers' convenience has been improved. For example, they can save time; before they often had to take other routes to avoid risks of having damages to the vehicles from the damaged roads, but now can run through the repaired road. Another example is that they can save cost; before they had to move slowly in the unrepaired road and their cargo (mining equipment, steel metal and chemicals) was sometimes stolen on the way, but now they can move more easily without cargo loss. Thirdly, the security has been secured for the tourists¹, according to the pedestrians and tourist lodges due to the street lights and improved sidewalks.

No negative impact on the natural environment has been observed. There was no land acquisition and no resettlement. <Evaluation Result>

As explained above, the average travel speed did not reach the planned figure during the period from the project completion to the completion of the repair work conducted by the Government of Zambia, but it exceeded the target figure at the time of the ex-post evaluation, as shown in Table 2. The quantitative effects possibly include those of the repair work, and therefore, the project effectiveness/impact is fair.

Table 2. Qualificative effects								
	2009 (before	2010 (target	2010 (target	2011	2012	2013	2014	
	the project)	year)	year)	Actual	Actual	Actual	Actual	
	Actual value	Target value	Actual value	value	value	value	value	
Average travel speed in Mosi O'Tunya Road (except urban areas) (km/h)	20-30	40-50	20-40	20-40	15-30	15-30	40-60	
(Supplementary information) Transit time in Mosi O'Tunya Road (except urban areas) (minutes)	N/A	N/A	20	20	25	25	8	
Number of the traffic accidents at night in the target area (km2+169 – km5+280)	N/A	N/A	2	2	2	2	3	

Table 2. Quantitative effects

Source: LCC.

Note: Km2+169 indicates the distance from the starting point of the road.

3 Efficiency

Outputs were produced as planned. However, problems including flow ruts were found in the defect inspection survey after the completion and repaired, attributed to inappropriate quality control during the road construction period. The project cost was as planned (ratio against the plan: 100%), but the project period exceeded the plan (ratio against the plan: 114%) because more time for traffic control and detour was required than supposed. Therefore, efficiency of the project is fair.

4 Sustainability

<Institutional Aspect>

Planning and management of the roads in the country is under RDA, and with its instruction LCC like other municipalities construct and maintains trunk roads in the urban area, including patching, repair of the sidewalks/road shoulders, cleaning/maintenance of the drainage facilities. RDA conducts the road condition survey every year and recommends the maintenance intervention. At RDA, there are two engineers and three technicians with two vacancies. These numbers are insufficient to monitor the maintenance work conducted by the private contractors. At LCC, there are one director, 7 staff in the Road Section and 5 in the Electrical Section under the Technical Service Department. These numbers are sufficient to conduct minor works such as repavement of the asphalt layers but not major works such as exchange of the road bed. Another small issue is the relocation of RDA Southern Province Office which is in charge of Livingston City from Livingstone City to Choma (approximately 190km from Livingstone City). It takes more time than before to transfer the equipment from Choma, when the road maintenance is needed in Livingstone City.

<Technical Aspect>

LCC personnel has sufficient techniques for cleaning of sand and trash in the drainage facilities, while they need capacity building for early detection of degradation, crack and potholes. LCC does not conduct any training for its personnel, but its personnel can participate in

¹ Livingstone City is a tourist area where the Victoria Falls (World Heritage) is located.

the training organized by the National Council for Construction. Regarding RDA, its personnel has sufficient techniques for road maintenance management, as the headquarters conduct training on project and contract management twice a year. RDA has inspection manuals, but they are not practical because they are just performance assessment sheets for the contractor and do not explain the inspection methods. The contracted companies which conduct major road repair works have sufficient techniques according to RDA. <Financial Aspect>

Both LCC and RDA receive the budget from the central government and donor funds including JICA and EU. LCC's budget for road maintenance has not been sufficient. The budget itself has increased since 2011, but the execution ratio has been very low (3-15%) between 2012 and 2014. The reasons were not available. The budget for operation and maintenance of the constructed street lights has been more than planned at the basic design study, but LCC does not have any concrete plan for updating the lights. With regard to RDA, its Southern Province Office has approximately 10 million ZMW² each year, while the financial data of the Livingstone City Office was not available. According to RDA, these offices' budget is sufficient to carry out routine road maintenance and contract for major repair works. <</p>

LCC and RDA regularly conduct maintenance of the roads, roadbeds and road shoulders, cleaning of the drainage facilities and maintenance of the streetlights³⁴. Major repair is outsourced to the private companies. Regardless these operation and maintenance, 1-25% of the roads and road shoulders and 26-50% of the sidewalks have some problems, according to LCC and RDA. And, 20 of the 62 constructed street lights were not functioning at the time of the ex-post evaluation survey, probably attributed to the inappropriate load shedding due to the lowered hydro power generation caused by shortage of rainfall with the recent climate change and dry season. Damages from the traffic accidents are considered as another reason of malfunctioning of the lights. In order to avoid the damages from the overloaded vehicles, RDA has two weighbridges. RDA and the contractors hired by RDA have sufficient equipment to conduct road maintenance, while LCC lacks the equipment due to the budget constraints.

<Evaluation Result>

Slight problems have been observed in terms of the institutional, technical, financial aspect of the implementing agency and current status of operation and maintenance. Therefore, sustainability of the project is fair.

5 Summary of the Evaluation

The project has partially achieved the objective "to ensure the smooth and safe traffic flow in Mosi O'Tunya Road." In other words, as a result of road repair, the travel speed increased, but the traffic accidents have not decreased at night. Regarding the project sustainability, although problems were not identified with RDA, LCC has not had sufficient budget for road repair and capacity building. The condition of some roads, road shoulders and sidewalks is not desirable and one-third of the street light is not functioning. As for the project efficiency, the project period exceeded the plan due that traffic control and detour required more than supposed.

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

III. Recommendations & Lessons Learned

<Recommendations for RDA and LCC>

- 1. It is recommended to RDA to request the central government for securing the budget in the long-term so that LCC can conduct road repair and maintenance of the street lights and drainage facilities.
- 2. It is necessary to conduct training for LCC personnel on early detection of degradation, crack and potholes. One means could be letting LCC personnel in RDA training.
- 3. It is crucial to take measures to reduce traffic accidents, by installing the traffic signs and street lights or installing humps to alleviate the speeding-up of the vehicles, in cooperation with Road Traffic and Safety Agency.

<Lessons Learned for JICA>

- 1. This project aimed at the smooth and safe traffic flow in the target area. As a result of road repair, the travel speed increased but the traffic accidents slightly increased. In order to achieve these competing objectives, at the project design stage, the project's influence on the traffic safety should be carefully examined, and possible countermeasures including those after the road repair should be considered, such as traffic signs, street lights and road humps. These measures may result in saving efforts on operation and maintenance cost after the project completion.
- 2. Problems including flow ruts were found in the defect inspection survey after the completion, which were attributed to inappropriate road construction of the contractor during the project, but these problems were improved by the Government of Zambia after the survey. These problems may cause not only traffic accidents, but also low recognitions of the nearby residents toward JICA support, as a part of interviewed residents showed disappointment at the quality of initial road repair of the project. JICA needs to supervise the consultant who makes an appropriate design based on the natural conditions, predicted traffic amount, available materials, etc. at the project design stage and also manages the contractor's work at the implementation stage.

 $^{^{2}}$ ZMW is Zambian Kwacha after denomination. 1 ZMW = 1,000 ZMK.

³ The demarcation between LCC and RDA is that LCC works in Livingstone City and RDA is responsible for the roads outside the city. However, when major repair is needed in the city, the contractor hired by RDA may work for it.

⁴ The following is conducted by LCC and RDA: (i) every six months or when damages occur, patching of the damaged roads and maintenance of the sidewalks is conducted, (ii) monthly transversal closed conduits and catch pits are cleaned, (iii) every week or when damages occur, maintenance of the road shoulders is conducted, (iv) everyday, cleaning/maintenance of the gutters and street lights are conducted, (v) maintenance of the roadbeds is conducted upon necessity.



(Mosi O'Tunya Road in the urban area)



(Lighted street lights at night)