Ex-Post Project Evaluation 2013:

Package III - 6

(Indonesia)

January 2015

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 2011, and Technical Cooperation projects and Grant Aid projects, most of which project cost exceeds 1 billion JPY, that were mainly completed in fiscal year 2010. 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.

January 2015
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.

Republic of Indonesia

Ex-Post Evaluation of Japanese ODA Loan

"Depok Depot Construction Project"

External Evaluator: Hideyuki TAKAGI, Ernst & Young Sustainability Co., Ltd.

0. Summary

This project was implemented under conditions in which traffic demand was increasing rapidly in the metropolitan area in Indonesia. The objective of this project is to improve the capacity for maintenance and operation services by constructing a new depot with maintenance facilities in Depok near Jakarta and conducting consulting services on railway operations, thereby contributing to strengthening the transportation capacity of Jabodetabek railways (hereinafter referred to as "KRL Jabodetabek") through the improvement of operational safety and the operating ratio of the railcars.

This project has been highly relevant to the development policy of Indonesia and its development needs, as well as Japan's ODA policy. In terms of effectiveness, the Depok depot has been kept in operation as planned: it accommodates and maintains the increased number of railcars. The increase in the number of train passengers has been identified as having had a significant impact in this project. The construction of the depot and the consulting services of this project have contributed to this impact by supporting the increase in the number of railcars in operation and improving the train scheduling. With all these facts taken into consideration, the project effectiveness and impacts are considered to be high. The project efficiency is fair because the project period exceeded the plan although the project cost was within the plan. The sustainability of the project effect is considered to be fair because some problems are observed in terms of the institutional aspects of the operation and maintenance of the Depok depot. In light of the above, this project is evaluated to be satisfactory.

1. Project Description

Project location

Depok depot (Inspection shed)

1.1 Background

The national capital area of Indonesia is formed with Jakarta at the center together with the adjacent four cities of Bogor, Depok, Tangerang, and Bekasi. This large metropolitan area is called as the “Jabodetabek area” and is the base of economic activities for the whole country. Traffic demand has increased substantially, especially for commuting to Jakarta as the population in the region has increased year by year. With the development of the city, traffic congestion and the limitations of the capacity of the public transportation network have become serious, which has been recognized as a problem of large cities since the late 1960s. In this situation, the Indonesian government (hereinafter referred to as “the Government”) is focusing on the high-speed mass transit functions of the railway as one of the policies for overcoming traffic congestion in the metropolitan area. It represents a policy of developing the railway as a main urban transport facility: utilizing the existing railway facilities and making aggressive investments in the railway system (Presidential Decree No.26/1982 and its amendments in No.67/1983). The development of a commuting railway network was a matter of policy for healthy economic growth. In the process of urban development, it was necessary to mitigate the impact of the road traffic by raising the proportion of public transport, from various viewpoints such as coping with the increase in traffic, urban development and environmental measures.

The Japan International Cooperation Agency (hereinafter referred to as “JICA”) carried out a series of ODA loan projects, the “Jabotabek Railway Modernization Projects (I - IX)” for the improvement of the country’s railway system. These projects correspond to the subprojects specified as specific area of improvement in the "Jakarta Metropolitan Railway Transportation Plan (master plan)” (1982). The first phase of the projects began in 1982 and continued until the ninth phase was completed in 2001. Throughout their implementation, these projects performed a significant role in the improvement of KRL Jabodetabek (Refer to the table 3.4-5 in the Efficiency section). The number of subprojects has risen to 18, which covered the procurement of railcars, the improvement of tracks, the construction of communication facilities, electrification, the improvement of depots, maintenance factories and stations, automated signaling, double track railway lines, elevation of the Central Line, etc. Most of the improvements to the railway were financed by Japanese ODA loans. This project under evaluation was implemented for the purpose of resolving the lack of capacity for the accommodation of railcars, the number of which was planned to increase in accordance with the reinforcement of transportation capabilities through the Jabotabek Railway Modernization Projects (I - IX).

1.2 Project Outline

The objective of this project is to improve the capacity for maintenance and operation services by constructing a new depot with maintenance facilities in Depok near Jakarta and

providing consulting services on railway operations[1], thereby contributing to the strengthening of the transportation capacity of KRL Jabodetabek through the improvement of operational safety and the operating ratio of railcars.

Loan Approved Amount / Disbursed Amount	JPY 9,223 million / JPY 7,454 million
Exchange of Notes Date / Loan Agreement Signing Date	January 1998 / January 1998
Terms and Conditions	Construction Works: Interest Rate: 2.7% Repayment Period: 30 years (Grace Period: 10 years) Conditions for Procurement: General Untied Consulting Service: Interest Rate: 2.3% Repayment Period: 30 years (Grace Period: 10 years) Conditions for Procurement: General Untied
Borrower / Executing Agencies	Republic of Indonesia / Directorate General of Railways (DGR), Ministry of Transportation
Final Disbursement Date	February 2012
Main Constructors (Over 1 billion yen)	Mitsubishi Heavy Industries, Ltd. (Japan) / Hitachi Plant Services Co., Ltd. (Japan) / PT. Wijaya Karya (Indonesia) / Sumitomo Corporation (Japan) (JV)
Main Consultants (Over 100 million yen)	Pkg. A: Pacific Consultants International (Japan) / The Japan Electrical Consultants Co., Ltd. (Japan) / Japan Transportation Consultants, Inc (Japan) (JV) Pkg. B: Japan Railway Technical Services (Japan) / PT. Metro Transportama Consultant (Indonesia) / OPMAC Corporation (Japan) (Japan) (JV) Pkg. C: Japan Railway Technical Services (Japan) / ALMEC Corporation (Japan) / PADECO Co., Ltd. (Japan) / OPMAC Corporation (Japan) (JV)
Related Studies (Feasibility Study) etc.	Jakarta Metropolitan Railway Transportation Plan (Master Plan, 1982)
Related Projects	Japanese ODA Loan Project:

[1] Among the consulting services Package A: Consulting services related to the construction of the Depok Depot, Package B: Consulting Services on the Action Plan for the Better Operation of the Jabotabek Railways, Package C: Consulting Services on the Further Development of the Jabotabek Railway Project, Packages B and C are for the improvement of railway operations.

	"Jabotabek Railway Modernization Project (I - IX)" (May 1982 – November 2001) Technical Corporation Project: "Study on the Integrated Transportation Master Plan for JABODETABEK (SITRAMP)" (2000 - 2004) "Project on Improvement of Service and Safety of Railway" (2004 – 2006), phase 2 (2007 – 2010) "Jabodetabek Urban Transportation Policy Integration (JUTPI)" (July 2009 – October 2011) Other International Cooperation Agencies: - Procurement of railcars through loans from Belgium and Holland - Procurement of railcars through loans from KfW Bankengruppe

2. Outline of the Evaluation Study

2.1 External Evaluator

Hideyuki TAKAGI (Ernst & Young Sustainability Co., Ltd.)

2.2 Duration of the Evaluation Study

Duration of the study: January 2014 – December 2014
Field study: April 14 – May 10, 2014 and August 25 – September 6, 2014

2.3 Constraints during the Evaluation Study

Regarding the consulting services Pkg. C, sufficient information could not be gathered from the parties concerned (i.e., consultants and Indonesian counterparts) due to their retirement, etc. Therefore, this component of the project has been eliminated from the evaluation study.

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

3.1 Relevance (Rating: ③[3])

3.1.1 Relevance to the Development Policy of Indonesia

At the time of both project appraisal and this ex-post evaluation, a focus on the mitigation of traffic congestion in the metropolitan area and strengthening of the transportation capacity of KRL Jabodetabek have been priority agenda items in the national policy of Indonesia. At the time of project appraisal, reinforcement of the transportation capacity of KRL Jabodetabek was listed as a railway development target of the transportation sector in the national medium-term development plan (REPELITA VI: 1994 - 1998). The Presidential Decree No.26/1982 (and its

[2] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory
[3] ③: High, ②: Fair, ①: Low

amendments in No.67/1983) also indicated a policy of developing the railroad as a main urban transport facility. A plan for the substantial shift from road traffic to the railroad was one of the policies for overcoming traffic congestion in the metropolitan area.

At the time of the ex-post evaluation, the national medium-term development plan (RPJMN I: 2010 - 2014) stipulates the reinforcement of the transportation system in four large cities of the county, including Jakarta and the network among these systems, as one of priority development goals in the field of infrastructure development. The priority policy for traffic congestion in the Jakarta metropolitan area (2010) promotes action for the improvement of metropolitan area traffic flows through cooperation among the related ministries (i.e., the Economic Coordination Minister Office, the Ministry of Transportation and the Ministry of Public Works) and the related local governments, including the special capital region of Jakarta. The "National Railway Master Plan" (April 2011) prepared by the Ministry of Transportation stipulates the development of the railroad network and improvement of services in the urban area, as one of priority strategies to cope with the expected increase in demand from railway users by 2030. In this master plan, development of a mass transit system in Jakarta metropolitan area is a main project to achieve the strategic target. In addition, the Presidential Decree No.83/2011 sets a target of an increase in the number of passengers for KRL Jabodetabek from approximately 300,000 people/day in 2010 to 1,200,000 people/day by 2018, by newly establishing a route that links the Soekarno Hatta International Airport with Tangeran city and by the development of a loop line. Based on the development plan and the Presidential Decree mentioned above, the Indonesian railway company PT. Kereta Api (hereinafter referred to as "PT. KAI") calculated the necessary increase in the number of railcars to be approximately 1,000 railcars, and it has moved to implement a plan for increasing and renewing railcars that targets an increase in 200 railcars and renewal of 16 to 20 old railcars per year from 2013 through 2018.

3.1.2 Relevance to the Development Needs of Indonesia

3.1.2.1. Changes in the population and the number of commuters in the Jabodetabek area

Population of the Jabodetabek area has been increasing and the number of commutes from various places into Jakarta has increased as well. The population in the Jakarta metropolitan area who are assumed to be the main users of KRL Jabodetabek has increased approximately 1.3 times, from 21.2 million in 2000 to 27.9 million in 2010. In addition, the number of the commuters from various places within the Jabodetabek area into Jakarta has increased approximately 1.5 times, from 743,000 trips in 2002 to 1,105,000trips in 2010[4].

[4] Source: Report of the Jabodetabek Urban Transportation Policy Integration (JUTPI)

3.1.2.2. Trends in the number of railway passengers

While the number of the commuters has been increasing as described above and the boarding rate of the railcars was high during the commuting hours[5], the overall number of passengers using KRL Jabodetabek was stable at around 120 million per year up to 2011. One of the factors affecting this situation was related to the railway operations, and another factor was related to the change in the means of commuting: an increase in train scheduling was not realized and motorization has progressed, including the use of motorcycles.

The commuter train services started in 2011 in order to meet the demand from commuters, who had been at the forefront of the large increase in the number of the passengers (Refer to the Figure 3.3-1 “Trends in the average number of railway passengers per day” in the Impact section). It is considered that the self-directed management efforts of the railway companies in recent years have been leading to improvements of its operations. Their efforts include "increase in train scheduling and the number of air-conditioned railcars", "improvement of security and convenience" and “revision of the rate system and the improvement of ticketing[6]". The fact that the boarding rate for railcars was high before the implementation of this project and improvements by railway companies have led to a considerable increase in the number of passengers indicates that the demand from commuters to use the train has been high from the time of project appraisal through to this ex-post evaluation.

3.1.3 Relevance to Japan’s ODA Policy

This project was relevant to Japan’s country assistance policy for Indonesia at the time of the project appraisal. It was included in the environmental management sector, one of the priority areas for assistance, in order to improve the residential environment to cope with the situation faced by population concentrations in a rapidly developing metropolis.

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

3.2 Effectiveness[7] (Rating: ③)

In this ex-post evaluation, the external evaluator set the quantitative indicators and qualitative effects based on the project purpose assumed at the time of the appraisal. The prospective effects of every component of the project are arranged as follows.

- Construction of the Depok Depot and consulting service Package A: This component is

[5] The boarding rate of the Bogor Line and the Bekasi line reached 300 - 400%. (Source: Report of the "follow-up study on the economic cooperation for the transportation sector")

[6] The convenience for the passengers has been improved due to the introduction of a prepaid card and automatic ticket gates, which enabled ticket purchases and the entry and exit to the station yard more user-friendly.

[7] The evaluation results of the project impacts are incorporated into the Effectiveness rating.

the main part of the project, and the effects of this component are regarded as the direct effects of the project, which is therefore valued as being the most important in the analysis of effectiveness. The main points analyzed in this evaluation are the quantitative indicators of the "number and percentage of railcars accommodated by the Depok Depot" and the "Number and percentage of inspections and repairs for railcars undertaken in the Depok Depot".

- Consulting service Package B: With regards to the effects of this component, its contribution to the improvement of railway operations is analyzed in terms of the qualitative effects and the impacts. In the determination of the sub-rating of effectiveness of the Project, effect of this component is weighted based on its cost which accounts for a small portion of the project as a whole.
- Consulting service Package C: It was assumed that the effects of this component would be measured by the degree of contribution that the investments made to the improvement of transport capacity and safe railway operations. However, due to the constraints during the evaluation study as mentioned above, this component of the project has been eliminated from the evaluation study.

3.2.1 Quantitative Effects (Operational and Effect Indicators)

Indicator 1: "Number and percentage of railcars accommodated by the Depok depot"

1) Target of the indicator

At the time of project appraisal, the capacity for railcar accommodation in KRL Jabodetabek had a shortfall of 20 railcars. In addition, it was expected that the shortfall in accommodation capacity would further worsen to 100 railcars by the end of 2000, taking the plan for increasing the number of railcars into consideration. In addition, a further increase in the number of railcars was anticipated in the near future. Therefore, a lack of accommodation capacity was predicted for 282 railcars in total. The target for the "number of railcars to be accommodated by the Depok depot" was set as the designed accommodation capacity of the Depok depot[8]. The designed accommodation capacity depends on the train formation: the target is set at 224 railcars if all trains consist of 8 cars and 336 railcars in the case of 12-car trains. Also the target of the "percentage of accommodated railcars to the lack of accommodation capacity[9]" was set at 79% as the minimum if all trains consist of 8 cars and at 119% as the maximum if all are 12-car

[8] The accommodation capacity of the Depok depot was designed to include 14 stabling tracks based on the existing accommodation capacity of the KRL Jabodetabek and the expected increase in the number of railcars at the time of project appraisal, and the land area of the project site. The accommodation capacity of 14 stabling tracks depends on the train formation: a maximum of 224 railcars can be accommodated if all trains have the conventional number of 8 cars, and a maximum of 336 railcars can be accommodated if all are 12-car trains in the future.

[9] The target for the "percentage of railcars accommodated in the Depok depot" was set as the percentage of accommodated railcars to the lack of accommodation capacity expected at the planning of the project.

trains.

2) Achievement of the target

At the time of the ex-post evaluation, all the trains accommodated in Depok depot are 8 cars (as of the end of August 2014). The "number of railcars accommodated in Depok depot" at the time of the completion of Depok depot construction (in other words, start of the operation of Depok depot in 2008) was 212, which almost achieved the target of 224 railcars. The "percentage of accommodated railcars" in relation to the lack of accommodation capacity of KRL Jabodetabek as a whole[10] was 75%, which almost achieved the target of 79% (percentage of achievement is 95% for both targets). However, after the start of the operation of Depok depot, the "number of accommodated railcars in Depok depot" had been at a low level due to the disposal of old railcars such as economy class trains. At the time of the ex-post evaluation, the "number of accommodated railcars" has recovered to 212 railcars (95% of the targeted number of railcars), since the replacement of the old railcars has almost been completed by then. (Refer to the Table 3.2-1)

Table 3.2-1 Actual percentage of the total number of railcars and the number and percentage of railcars in-use accommodated in the Depok depot

		2008 [2]	2009	2010	2011	2012	2013	2014 [3]
Target number of the railcar accommodation capacity	(a)	282	282	282	282	282	282	282
Designed number of the railcar accommodation capacity [1]	(b)	224	224	224	224	224	224	224
Total number of accommodated railcars	(c)	212	186	178	188	184	176	212
% of accommodated railcars to the target capacity	(d) (c) / (a)	75%	66%	63%	67%	65%	62%	75%
Number of accommodated railcars (overhauled or retired)	(e)	52	28	12	14	40	32	16
Number of accommodated railcars in operation	(f) (c) – (e)	160	158	166	174	144	144	196
% of accommodated railcars in operation	(g) (f) / (b)	71%	71%	74%	78%	64%	64%	88%

Source: Prepared by the external evaluator based on the information regarding the number of accommodated railcars provided by PT. KCJ

Notes: [1] Railcar accommodation capacity in the case of 8-car trains / [2] At the time of project completion / [3] Data as of August 2014

3) Number and the percentage of accommodated railcars in operation

In addition to the total number of railcars, an analysis was also made also for the "number

[10] After the beginning of 2014, 10-cars trains have been introduced and accommodated at the Bunkit Duri depot. It is expected that this indicator will be highly achieved in the future as the 10-cats train increase and accommodated in the Depok depot.

and the percentage of accommodated railcars in operation". At the time of the completion of the Depok depot construction, the "number of accommodated railcars in operation" was 160, and the "percentage of accommodated railcars in operation" compared to the lack of accommodation capacity of KRL Jabodetabek as a whole was 71%. The "percentage of accommodated railcars in operation" had been at the 70% level at that time, because the rate of non-operating railcars was high because they were kept in the depot waiting for an overhaul for the effective practical use of the old railcars. In addition, the "percentage of railcars in operation" had been reduced from 2012 through 2013 as the old cars without air conditioners were retired when the operation of commuter trains started. At the time of the ex-post evaluation, as the replacement of old railcars had mostly been completed, the number of railcars in operation had increased. The "number of accommodated railcars in operation" was 196, and the "percentage of accommodated railcars in operation" compared to the lack of accommodation capacity of the KRL Jabodetabek as a whole was 88%. (Refer to the Table 3.2-1)

Indicator 2: "Annual number and percentage of inspections and repairs for railcars in the Depok depot"

Basically, every railcar in operation accommodated in the Depok depot undergoes a routine inspection and repairs. Therefore, the "number and percentage of trains under inspection and repair" in the Depok depot are the same as the "number and the percentage of accommodated railcars in operation" analyzed at the indicator 1 above. The "number and percentage of inspection and repair for railcars" in the Depok depot were 160 and 71%, respectively, at the time of the completion of the Depok depot construction; 196 and 88% at the time of the ex-post evaluation. (Refer to the Table 3.2-1)

As a result of the quantitative analysis, it is confirmed that the level of utilization of the Depok depot has been high. It has been operated as planned; in other words, the depot provides the accommodation and maintenance of railcars in accordance with the design of its facilities. The "number of accommodated railcars" at the time of the completion of Depok depot construction was high because the number of railcars accommodated in the depot equals 95% of its designed accommodation capacity. While the "number of accommodated railcars in operation" was only 71% at the time of the completion of the Depok depot construction, it rose to 88% by the time of the ex-post evaluation after the replacement of old railcars. The "number and percentage of inspections and repairs" followed the same course of events as the "number of accommodated railcars in operation". The percentage is 88% at the time of ex-post evaluation, a high level of utilization of the depot facilities.

Photo 1. Commuter trains accommodated on the stabling tracks

Photo 2. Maintenance of railcars using a wheel tread re-profiling machine

3.2.2 Qualitative Effects

1) Improvement in the railway operation and services

In the consulting services package B "consulting services on an action plan for the better operation of the Jabotabek railways", technical assistance was provided mainly on the basic railway operation. Specifically, action plans to reduce inadequate operations such as human error in the preparation of train diagrams, train accidents caused by human error and illegal passengers (taking a free ride) were made and implemented. According to the former project manager of the Indonesian counterpart of this consulting package, the knowledge and skills transferred are taught in the academy of transportation[11], where he is now an instructor, since these are essential elements for the improvement of railway operations. The staffs of the railway companies apply what they learned at the academy. The former Japanese site project manager sees the effects of the consulting service likewise: according to him, the action plan has been implemented through the efforts of the railway companies themselves, and the effects can be currently observed in the better operation of the trains. It is concluded that the implementation of the consulting package has contributed to the development of technical capacity that has led to the improvement of railway operations, as described in the "Trends in the number of railway passengers" in the "Relevance to the Development Needs of Indonesia" section.

It is presumed that it took years for train passengers to recognize the improvement since the action plan had not been implemented as was planned due to the lack of a maintenance budget and insufficient number of railcars etc., and also the implementation of the action plan is the basic requisite for proper railway operation. (According to the

[11] This is a facility for land transport education and training under the Ministry of Transportation. Staff from the Ministry of Transportation and private companies who are engaged in land transport take lectures here.

interview survey conducted in this ex-post evaluation, improvement of the railway operation and services has been recognized by the passengers after 2013)[12].

3.3 Impact

3.3.1 Intended Impacts

At this ex-post evaluation, the impact indicators were reset. Those indicators are a "decrease in problems with the railcars", the "Improvement of operational safety" and the "strengthening of the transportation capacity". However, it was identified during the evaluation study that the data necessary for the comparison analysis of each indicator could not be gathered due to events such as organizational changes in the railway company or data loss due to flood damage. Therefore, the analysis of the impacts was made based on information from interviews with the persons in charge in the railway company.

1) Reduction in the problems with railcars

Indicator 1: "Decrease in the annual number of problems with railcars and delays"

According to PT. KAI Commuters Jabodetabek (hereinafter referred to as PT. KCJ) which operates the commuter trains, its management made a decision to stop using the old railcars after 2011 in order to improve the services for users. The company has replaced old railcars in recent years, and the number of problems with railcars and delays have decreased compared to previous years.

2) Improvement of operational safety

Indicator 1: "Decrease in the annual number of train accidents"

The trend in the number of train accidents is shown in the table below, and these were caused by operational failures, the entering of a vehicle onto a railroad level crossing, etc. The effects of the project including the consulting package B "consulting services on an action plan for the better operation of the Jabotabek railways" on this indicator were not analyzed, since the data necessary for the comparison analysis could not be obtained. However the number of train accidents per year in the period following the project implementation was none or only a few.

[12] At this ex-post evaluation, an interview survey was conducted to gather information about the improvement of the railway operation covering a small number of people. A total of 26 people were selected at random, consisting of 16 males and 10 females aged more than 20 years old. The survey was conducted by a local assistant using a questionnaire: the local assistant asked questions and wrote down the answers on the questionnaire. The results of the survey indicates that the safety, convenience and comfort for passengers significantly improved after around 2013.

Table 3.3-1 Trends in the number of train accidents involving KRL Jabodetabek

(Unit: Number of accidents)

2002 - 2005	2006 · 2007	2008	2009	2010 - 2012	2013
1	0	1	3	0	1

Source: PT. KAI

Indicator 2: “Decrease in the annual number of derailments”

Since the start of PT. KCJ’s operations in 2009 there have been only three derailments (one in 2012 and two in 2013). The effects of the project were not analyzed for this indicator either, since the data necessary for the comparison analysis could not be obtained during the evaluation study. Similar to the indicator of train accidents, the number of derailments per year in recent years was none or only a few.

3) Strengthening of the transportation capacity

Indicator 1: “Improvement in the operating ratio of railcars through shortened maintenance periods”

According to PT. KCJ, railcars are maintained in accordance with a schedule that provides for an inspection both daily and monthly. As described in the Effectiveness section, the replacement of old railcars has almost been completed. Therefore, old railcars that required considerable time and labor to repair had already been retired at the time of the ex-post evaluation. For these reasons, the company is now able to provide maintenance in accordance with the schedule at its facilities for the inspection and repair of railcars, including the Depok depot. It is considered that the number of railcars in operation has increased under this situation. This project has performed the role of supporting an increase in train scheduling through its contribution to enabling an increase in the number of railcars in operation and development of the technical capacity for railway operations. The operating ratio of the railcars of KRL Jabodetabek as a whole declined during the period when the old railcars were being replaced, but it has increased up to 80% at the time of the ex-post evaluation as the replacement has almost been completed. (Refer to the Table 3.3-2)

Table 3.3-2 Trends in the number of railcars, the operating ratio and train scheduling in KRL Jabodetabek

	1997[1]	2004	2005	2006	2007	2008[2]	2009[3]	2010	2011[4]	2012	2013[5]	2014[6]
Total No. of railcars	200	352	384	392	407	456	480	520	559	669	584	612
No. of railcars in operation	148	246	264	268	319	344	312	341	400	456	418	490
Operating ratio	74%	70%	69%	68%	78%	75%	65%	66%	72%	68%	72%	80%

No. of scheduled trains per day [7]	-	284	-	-	337	423	447	485	459	530	568	669

Source: PT. KAI (before 2009), PT. KCJ (after 2009)

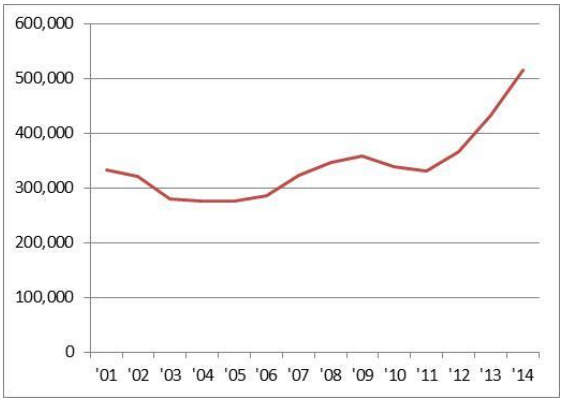
Notes: [1] At the time of the project appraisal /[2] Operation of Depok depot started /[3] Operation of PT. KCJ started /[4] Express train services were discontinued, commuter train services started /[5] Change in the fare structure (July) /[6] Data as of August /[7] Number of scheduled trains per day increased about 2.4 times from 248 trips per day in 2004 to 669 trips per day at the time of the ex-post evaluation (as of May 2014)

Indicator 2: "Increase in the number of railway passengers as the effect of the improvement in the operating ratio"

The number of passengers had been around 300,000 per day from the time of the project appraisal through to the beginning of the Depok depot operations. The number of passengers has been increasing since the start of commuter trains in 2012 and it exceeded 500,000 per day at the time of the ex-post evaluation (as of the end of March 2014).

The number of passengers on weekdays was around 500,000 per day as of July 2013, right after a substantial reduction in the fare under the conventional rate structure due to the revision of the rate system, and it increased to 600,000 per day by the time of the ex-post evaluation.

(Unit: People)



Source: PT. KAI, PT KCJ

Figure 3.3-1 Trends in the average number of railway passengers per day

3.3.2 Other Positive and Negative Impacts

There have been no particular impacts on the natural environment, either positive or negative, observed as a result of this project. The acquisition of the land for project site (about 20 ha) was completed before the project appraisal and no issues were reported in relation to resettlement and land acquisition. Regarding the Environment Impact Assessment (EIA), explanation and talks to neighboring inhabitants were carried out appropriately during its process, and it was completed before the bidding for the construction work. However, the original EIA expired because of a delay in the start of construction. The assessment was carried out again at the time of an application for construction permission to Depok city, which was approved in 2004. During the process of the 2nd EIA, an underpass and overpass were added to the construction work, accepting

the requirement from the neighboring inhabitants on securing a community road[13].

As a result of the impact study, it was confirmed that the current situation related to the impact indicator has basically been improved. In particular, a substantial increase in scheduled trains per day and the number of passengers has been recognized in terms of the "strengthening of the transportation capacity" after the commuter train services started. The construction of the depot and the consulting services for this project have contributed to the strengthening of the transportation capacity by supporting an increase in the number of railcars in operation and improved train scheduling.

It is considered that the depot constructed by the project has been effective as planned, and it has contributed to the realization of impact to a certain degree. Therefore its effectiveness and impact is high.

3.4 Efficiency (Rating:②)

3.4.1 Project Outputs

1) Construction work and consulting package A

There were additional works compared to original plan for the construction of the Depok depot as follows. The additional works were carried out based mainly on the consideration of technical aspects; therefore the changes in the plan are regarded as relevant. The renewal of a Depok electricity substation, which was added to the project, is also regarded as relevant since it was found in the process of the project implementation that the substation facilities were too old to supply power to the Depok depot and its renewal could solve a capacity shortfall on the Bogor line, which is expected to improve train scheduling, and enable the number of railcars with air conditioners to be increased. The final disbursement date was re-extended due to the decision on the substation renewal work. Construction work on Depok depot is classified as follows.

Table 3.4-1 Original plan and additions to the construction work

Classification	Original plan	Additional work
Depok Depot		
Track work	14 Stabling tracks, 500 m of access track, Inspection tracks, Car cleaning track, Train make-up track	Track layout revision, Extension of the wheel tread profiling track
Inspection facilities	Inspection shed, Railcar washing machines, Machines, tools and instruments for inspection and repair	—
Wheel tread re-	Wheel tread re-profiling shed, Wheel	—

[13] Additional works for the Depok depot construction and classified as roads

profiling facilities	tread re-profiling machine, Machines, tools and instruments for wheel tread re-profiling	
Buildings	Administration building, Maintenance staff office, Store house, Signal cabin building	Mosque, Dormitory for train drivers
Electricity	Power station and power distribution systems, Signal and telecommunication systems	Power distribution system (500 kVA), Modification of the signaling system Telecommunications
Water facilities	Water supply storage, Drainage system, Effluent treatment facilities, Concrete box culverts for drainage	Flood control
Roads	Roads for depot access, Patrol and outer access roads, 3 over bridges for pedestrians and bikes	Underpass, Overpass
Other than Depok Depot (Utilization of contingent budget of the loan)		
Substation	—	Depok substation renewal work (at Depok Station)

Source: PT. KAI

2) Unused maintenance machinery

The Depok depot was designed as a modern rolling stock base with large maintenance machines. However, an operation program necessary for the mechanization of railcar maintenance was not introduced together with the installation of this machinery. As a result, the current situation seems that some of these machineries have not been fully utilized at the time of ex-post evaluation. It is conjectured that the need for the installation of this machinery itself or the introduction of an operation program should have been considered in detail at the design stage of the project.

Photo 3. Unused maintenance machinery (Wheel-set washing machine)

3) Consulting package B

This consulting service provided the preparation and implantation of concrete action plans for better operation of the Jabodetabek railways. The main focus of the action plans were “securing safety in train operations”, “improving passenger services” and “improving maintenance efficiency”. According to the final report of the consulting service, a short-term action plan has been put into practice following its preparation in 2000. Likewise, a medium-to-

long term action plan has been put into practice with necessary modification since it was formulated in 2002.

4) Consulting package C (Reference only)

At the consulting package C, a short and medium-term investment plan for KRL Jabodetabek was prepared. The following are the priority area for improvement in the investment plan.

Table 3.4-2 Classification and major investment items of the short and medium-term investment plan

Classification	Major investment items
Strengthening transportation capacity	Construction of the MRT and connection to KRL Jabodetabek, Double-double tracking of the Bekasi line, etc.
Improvement of safety	Backup safety system (ATS: Automatic Train System or ATC: Automatic Train Control), Upgrading the overhead catenary systems, New workshop and depot, etc.
Improvement of intermodal and convenience	Construction of a new line to Soekarno-Hatta international airport, etc.

Source: Final report of the consulting package C (Consulting Services on the Further Development of the Jabotabek Railway Project)

The implementation of consulting package C was postponed until the completion of "the Study on the Integrated Transportation Master Plan for JABODETABEK (SITRAMP)" in order to reflect the results of study, which aimed to develop a general urban traffic master plan and conduct a feasibility study on specific prioritized projects or program. The TOR of the consulting service was also modified in order to reflect the results of SITRAMP, and to respond to the observation that the status of operation and maintenance of the KRL Jabodetabek was still poor at that time. After the modification of the TOR, a comprehensive medium-term investment plan for the KRL Jabodetabek[14] was prepared, which presented a vision of the railway operations and management in 2020, prioritizing and arranging the investment plans.

3.4.2 Project Inputs

3.4.2.1 Project Costs

The actual project cost of 9,155 million yen was within the plan of 12,297 million yen (74% of the planned cost). The planned and actual project costs are compared in the table below,

[14] Although the plans related to MRT (Strengthening transportation capacity) made up the major part of investment plans prepared by the consulting package C, the feasibility of the plans had already been examined in the SITRAMP completed in 2004 before the start of this consulting service. In this consulting service, an analysis was made on the medium-to-long term financial needs as an additional study on the master plan. The development of a new rail network to the airport (improvement of intermodal transfer and convenience) has been promoted as a part of the Metropolitan Priority Area for Investment and Industry (MPA) that the Japanese government drew up in 2010. On the other hand, the introduction of a backup safety system (improvement of safety) has not been introduced so far, as its technical aspects need to be re-examined.

itemized by the project components.

Table 3.4-3 Comparison of the planned and actual project costs

(Unit: Million yen)

Component	Plan			Actual			Difference
	Foreign	Domestic	Total (a)	Foreign	Domestic	Total (b)	(b) – (a)
Construction work	6,101	1,637	7,738	4,966	2,727	7,693	- 45
Price contingency	583	324	907	–	–	–	–
Physical contingency	668	196	864	–	–	–	–
Sub-total	7,352	2,157	9,509	4,966	2,727	7,693	- 1,816
Consulting Pkg. A	676	386	1,062	554	119	673	- 389
Consulting Pkg. B	218	185	403	258	76	334	- 69
Consulting Pkg. C	128	77	205	146	49	195	- 10
Sub-total	1,022	648	1,670	958	244	1,202	- 468
Tax	–	1,118	1,118	–	260	260	- 858
Total	**8,374**	**3,923**	**12,297**	**5,924**	**3,231**	**9,155**	**- 3,142**

Source: JICA internal material

The main reason that the actual project cost exceeded the plan was a dramatic exchange rate fluctuation influenced by the Asian financial crisis which started in Thailand in July 1997. The value of the Indonesia rupiah against the Japanese yen dropped to 0.010 on average for the period during which the disbursements were made for the construction of the Depok depot, whereas it was 0.052 at the time of the project appraisal.

3.4.2.2 Project Period

The actual project period was 168 months, which far exceeded the plan of 81 months (more than 200% of the plan) [15]. The planned and actual project period are compared in the table below, together with the differences and being itemized by the project components.

Table 3.4-4 Comparison of the planned and actual project periods

Component	Plan		Actual		Difference	
	Period	No. of months	Period	No. of months	Period	%
Construction work:						
Depok depot and Depok substation	‘97/11-‘04/ 7	81 mo.	‘98/1-‘11/12	168 mo.	87 mo.	207%
Consulting services						
Consulting Pkg. A	‘97/11-‘03/ 6	68 mo.	‘98/1-‘07/8	116 mo.	48 mo.	171%

[15] The completion of this project is defined as the start of the use of the constructed Depok depot and the delivery date for the Depok substation renewal work.

Consulting Pkg. B	‘97/11-‘01/ 6	44 mo.	‘98/1-‘03/7	67 mo.	23 mo.	152%
Consulting Pkg. C	‘97/11-‘99/12	26 mo.	‘98/1-‘06/10	106 mo.	80 mo.	408%

Source: JICA internal materials

The main reasons for the differences on both the Depok depot construction and the consulting package A are the delay in the selection of consultants (26 months) and the bidding of contractors due to a technical review for the signaling system (48 months). Consulting package B was delayed mainly because it took a long time for the selection of the consultants thereby delaying the start of its implementation (13 months), and the extension of the project period for one year due to a delay in the assignment of the Indonesian side counterparts. Consulting package C was delayed mainly because it was postponed until the completion of SITRAMP in order to reflect the results of study and modifications made to its TOR (80 months).

3.4.3 Results of the Calculation of the Internal Rates of Return (Reference only)

Financial Internal Rate of Return (FIRR)

In terms of the FIRR, the project is an investment for the improvement of the operation and maintenance of KRL Jabodetabek. In other words, the project does not directly relate to an increase in income from railway freight, which is a financial benefit of this investment. Therefore, the calculation of the FIRR was excluded from the appraisal and the ex-post evaluation of this project.

Economic Internal Rates of Return (EIRR)

The EIRR was calculated at the time of the project appraisal, which analyzed the comprehensive effects of the costs and benefits of the “Jabotabek Railway Modernization Project (I - IX) [16]” implemented before this project. According to the report of the project appraisal, the result of the calculation was 13.4%, at a level where economic rationality was recognized. Elements of the calculation are as follows.

Costs: Investment amount for the “Jabotabek Railway Modernization Project (I - IX)” and construction costs for the Depok depot, and operation and maintenance costs of the railway

Benefits: Time saving benefits for railway passengers, benefits from the elevation of the central line (time saving benefits for the passengers and drivers of road vehicles and the cargo of trucks, risk avoidance at railroad crossings, use of the land under the elevated railroad track, etc.)

[16] The projects were implemented based on the "Jakarta Metropolitan Railway Transportation Plan (master plan)” (1982), which performed a significant role in the improvement of the railway.

Recalculation of the EIRR was performed at the time of the ex-post evaluation, by updating only the investment for the construction of the Depok depot among the cost items. The effect of the results of the recalculation was very little after all since this investment amount accounts for only a small percentage of all the cost items. In the "impact study on transportation projects in Jabotabek" (2003), an evaluation was made for Japanese ODA loan projects for KRL Jabodetabek, including the "Jabotabek Railway Modernization Project (I - IX)". In this report, the EIRR of the 18 projects including this project before completion was reported to be about 15%.

Table 3.4-5 Summary of the Jabotabek Railway Modernization Projects (I - IX)

Phase	L/A Date	Summary of the project
I	May 1982	Procurement of rails, crossing facilities, trains (12 railcars), and engineering services.
II	Sept 1983	Renovations of carriage depots and factories, procurement of trains (4 railcars), and engineering services
III	Jun 1984	Procurement of trains (4 railcars) and diesel cars (28 railcars)
IV	Dec 1985	Signaling improvements (between Manggarai and Bogor on the Central line 44.9 km), double track construction (Between Manggarai and Depok on the Central line 22.8 km), detailed design of the two level crossings at Manggarai station, and project management services.
V	Mar 1987	Electrification of the Bekasi line (14.8 km), improvement of the vicinity of Kamppom and Bandan stations (The looping of the Western and Eastern lines), procurement of trains (Central line 8 railcars), new station and bridge construction, temporary line construction and signaling improvements.
VI	Dec 1987	Construction of section A (4,050 m) of an elevated bridge (whole length 8,650 m) of the northern end (on the side of Jakarta and Kota station), electrification and track construction, consulting services.
VII	Dec 1989	Elevated bridge construction, track construction and consulting services.
VIII	Sept 1991	Enlarging and raising the platforms of 4 stations (Manggarai, Jatinegara, Pasar Sunen and Tanah Abang), improvement construction of footbridges, procurement of trains (24 railcars), project management services and supplying training machinery and materials.
IX	Oct 1992	Automatic signalization of the Eastern line and Western line, train operation supervision system, procurement of trains (24 railcars), consulting services.

Source: Impact Study on Transportation Projects in Jabotabek (JICA, 2003)

Although the project cost was within the plan, the project period exceeded the plan. Therefore, efficiency of the project is fair.

3.5 Sustainability (Rating: ②)

3.5.1 Institutional Aspects of Operation and Maintenance

3.5.1.1 Institutional aspects of operation and maintenance of KRL Jabodetabek

The operation and maintenance of this project have been undertaken by the DGR of Ministry

of Transportation, PT. KAI and PT. KCJ.: DGR is the executing agency for the project and it oversees the railway operations as a supervisory authority, PT. KAI is the railway operator and PT. KCJ is a subsidiary company of PT. KAI, which operates the commuter trains. At the time of the ex-post evaluation, it was observed that the effect of this project has been sustained systematically, considering that the number of railway passengers has been increasing as a result of the management reform of the railway operators based on the regulations of the Ministry of Transportation.

Each agency assumes the roles as follows.

1) Directorate General of Railways (DGR)

The DGR draws up and implements the policy and the technical standards for railways as a supervisory authority. For example, inspectors are dispatched to each office of the railway operator every 6 months in compliance with the Ministerial regulation No.9/2011. At the inspection, the implementation situation of the service standards is checked, which is stipulated by the regulation for the improvement of railway operations.

2) Railway operators

a) PT Kereta Api (PT. KAI)

PT. KAI was established as a private corporation in accordance with privatization of a public railway corporation PERUMKA, based on the regulation No.19/1998 of Ministry of Transportation. The roles of PT. KAI in the operation of KRL Jabodetabek are the improvement and maintenance of the infrastructure, such as tracks, signals and railroad crossings. PT. KAI consists of regional departments, and KRL Jabodetabek is under the control of DAOP 1 Jakarta, which covers the Jakarta area.

b) PT.KAI Commuter Jabodetabek (PT. KCJ)

PT. KCJ was established in September 2008 as a subsidiary company of PT. KAI, which owns nearly 100% of its shares, and started operations in 2009. PT. KCJ operates the commuter trains in the Jabodetabek area, and the maintenance of electric railcars at depots including that in the Depok depot has currently been the role of the company. Until the operations of PT. KCJ started, the operation and maintenance of the Depok depot had been undertaken by PT. KAI since the depot came into use.

3.5.1.2 Institutional aspects of the operation and maintenance of the Depok Depot

The technical departments of PT. KCJ perform the operation and maintenance of the Depok depot. PT. KCJ needs to secure enough personnel in the depot since it has been getting hard to

continue the operation and maintenance of the depot with the current number of staff, under the situation in which the number of railcars has been increasing. According to the personnel in charge of depots in PT. KCJ, the current number of staff at the Depok depot is 119; however, there it needs more than 30 additional staff with the increase in the number of railcars (in total, including 4 sub-depots, more than 60 additional staff are required). Securing additional personnel is also necessary for replacing retired staff, which numbered 23 in the past 3 years. It was observed in the study that there is a difference in the recognition of the personnel setup between the management side and the personnel in charge of the depots[17]. It is expected that information regarding the current condition of the depots is shared by both sides, so that the depots can have the appropriate number of staff in their personnel organization. (Refer to '4.2. Recommendation'.)

No specific problem is observed in the institutional aspects of the operation and maintenance of KRL Jabodetabek as a whole. However, the Depok depot needs to secure enough personnel.

3.5.2 Technical Aspects of Operation and Maintenance

3.5.2.1 Technical aspects of operation and maintenance of KRL Jabodetabek

The technical aspects of the operation and maintenance of KRL Jabodetabek seem to keep improving: the railway operation has improved due to managerial efforts and it is engaged in actions for further improvement such as through cooperation with JR East in Japan.

3.5.2.2 Technical aspects of operation and maintenance of the Depok Depot

There is a system of training personnel for the maintenance of the railcars: the staffs in the Depok depot are required to take training courses at a training center and in-house training[18]. Although manuals on the maintenance of the machinery are not complete and some of them have been lost, there have been no problems because the in-house training covers the handling of this machinery, according to the maintenance staff in the Depok depot. At the maintenance site, staff is allocated based on their technical level, and railcars are maintained in accordance with a maintenance schedule. The railcars are maintained based mainly on a daily and monthly basis by 2 groups of staff for which the most capable and experienced person is selected as the

[17] According to the opinion of those who are in charge of the depots, it is necessary to increase the number of depot staff to provide an appropriate level of maintenance for the railcars. According to the human resources department of the company, the assignment of staff is made based on the workload at each place; however, it considers that there a need for more communication between the management side and the personnel in charge of the depots to correct the situation.

[18] The staff of PT. KAI and PT. KCJ are required to take training courses at a training center in Bekasi. The courses consist of 4 levels: the first 2 levels focus mainly on technical training, and the 3rd and 4th level include management. The training provides both classroom learning with text books and practice using simulators. Technical training covers from the basics to specific equipment, such as from air conditioners to traction motors. In-house training is given as needed aimed at enhancing knowledge of the technical aspects.

leader. Based on the current situation of training and maintenance, the technical level of operation and maintenance of Depok Depot is considered to be sufficient to sustain the effects of the project.

No specific problem is observed in terms of the technical aspects of the operation and maintenance of both KRL Jabodetabek as a whole and the Depok depot, as the operation has been improved by the company's managerial efforts.

3.5.3 Financial Aspects of Operation and Maintenance

3.5.3.1 Financial aspects of operation and maintenance of KRL Jabodetabek

The management of PT.KCJ is substantially a business segment of its parent company PT. KAI in all aspects including its finance and human resources management. In other words, PT. KCJ performs part of the business of PT. KAI. The financial condition has been stable for the past 3 years on a consolidated basis, including the subsidiaries. There have also been large amounts of capital investments in the cash flows for investment activities, which indicate managerial efforts for the further improvement of railway operations.

Table 3.5-1 Financial stability of PT. KAI (Consolidated financial information)

(Unit: Million Rupia)

Item	2010	2011	2012
Debt (interest bearing)	161,824	518,922	1,498,760
Equity capital	3,997,810	3,948,195	5,323,413
Debt-equity ratio (Debt / Equity)	4%	13%	28%

Source: Financial statements of PT. KAI and calculation by the external evaluator

3.5.3.2 Financial aspects of operation and maintenance of the Depok depot

Although the financial information was not provided by PT. KCJ from the viewpoint of confidentiality, according to the financial department, the budget for the operation and maintenance of the Depok depot has basically been allocated as requested by the related departments. It is therefore considered that there is no concern with the financial aspects in keeping the maintenance of railcars in accordance with the schedule, as the necessary budget has been secured.

Financial information on PT. KAI shows the strong financial condition of the company, including its subsidiaries. Budget allocation for the operation and maintenance of the Depok depot has been made appropriately. The current fare structure applying a government subsidy has had positive effects on the rise in the number of railway passengers. Therefore, it is

considered that no specific problem exists in terms of the financial aspects of the operation and maintenance of the Depok depot.

3.5.4 Current Status of Operation and Maintenance

According to the technical staff of PT. KCJ, the facilities of the Depok depot are kept in good condition except for the unused machinery described in the Output section, and these facilities are utilized well in the maintenance of railcars. However, problems have occurred even in the replaced railcars since these are secondhand and the old parts fail more frequently[19]. It is difficult to obtain spare parts for the old types of railcars in general; therefore, the depot recycles parts from retired railcars.

Some problems have been observed in terms of the institutional aspects of the operation and maintenance of the Depok depot. Therefore the sustainability of the project effect is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project was implemented under conditions in which the traffic demand was increasing rapidly in the metropolitan area in Indonesia. The objective of this project is to improve the capacity for maintenance and operation services, by constructing a new depot with maintenance facilities in Depok near Jakarta and providing consulting services for railway operations, thereby contributing to the strengthening of the transportation capacity of Jabodetabek railways (hereinafter referred to as "KRL Jabodetabek") through the improvement of operational safety and the operating ratio of railcars.

This project has been highly relevant to the development policy of Indonesia and its development needs, as well as Japan's ODA policy. In terms of effectiveness, the Depok depot has been kept in operation as planned: it accommodates and maintains the increased number of railcars. The increase in the number of train passengers has been identified as a significant impact of this project. The construction of the depot and the consulting services for this project have contributed to the impact by supporting an increase in the number of railcars in operation and improved train scheduling. With all these facts taken into consideration, the project effectiveness and impacts are considered to be high. The project efficiency is fair because the project period exceeded the plan although the project cost was within the plan. The sustainability is considered to be fair because some problems are observed in terms of the institutional aspects of the operation and maintenance of the Depok depot. In light of the above,

[19] According to the technical staff of PT. KCJ, problems with the railcars due to the old parts occur especially in the traction control devices, which may cause delays in the train operation.

this project is evaluated to be satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agencies

None

4.2.2 Recommendations to the railway operators (PT. KAI and PT. KCJ)

- To increase the number of staff in depots: According to the personnel in charge of depots in PT. KCJ, it is necessary to secure enough personnel to provide appropriate maintenance of the railcars under a situation in which the train scheduling has been increasing. While the number of railcars is prospected to increase in the future, the current number of staff who maintains the railcars has not been sufficient. Therefore, it is expected that the information regarding the current personnel setup of the depots will be shared by both the management side and the personnel in charge of the depots, thereby enabling the depots to have the appropriate number of staff for the maintenance of railcars in their personnel organization.

4.2.3 Recommendations to JICA

None

4.3 Lessons Learned

- Necessity for careful examination for an installation of large maintenance machinery at the planning of a project: Depok Depot was designed as a modern rolling stock base with large maintenance machinery. However, an operation program necessary for the mechanization of railcar maintenance was not introduced together with the installation of this machinery because a decision was made to prioritize and use budget for the additional works for renewal of the Depok substation work over the operation program. As a result, the current situation seems that some of this machinery has not been utilized as it had been intended by the time of ex-post evaluation. In the case of designing a facility in which a process is to be mechanized aiming the operation to be efficient in a similar way to this project, there needs to be an introduction such as in the form of an operation program for any newly adopted technology, otherwise there is a possibility that the machinery will not be utilized and the expected effects will not be achieved. The following points should be addressed for the future development of cooperation projects: 1) understanding of the technical level of the executing agency (in the case of this project, the railway company as the operator) in the designing of the facility

(including the machinery to be installed), so that the feasibility of its operation and management is secured as it was expected to, 2) detail consideration of comprehensive technical assistance, which also covers the operation and management of the facility.

Comparison of the Original and Actual Scope of the Project

Item	Original	Actual
(1) Project Outputs	・ Construction of a depot (construction work and consulting service Pkg. A) ・ Consulting services on an action plan for the better operation of Jabotabek railways (consulting services Pkg. B) ・ Consulting Services on the Further Development of the Jabotabek Railway Project (consulting service Pkg. C)	・ Construction of a depot and substation renewal work (construction work and consulting services Pkg. A) ・ Consulting services on an action plan for the better operation of the Jabotabek railways (consulting services Pkg. B) ・ Consulting Services on the Further Development of the Jabotabek Railway Project (consulting services Pkg. C)
(2) Project period	Depok depot construction work: Nov. 1997 – July 2004 (81 months) Renewal work for the Depok substation: March 2009 – Feb. 2011 (24 months)	Depok depot construction work: Jan. 1998 – Jan. 2008 (121 months) Renewal work for the Depok substation: March 2009 – Dec. 2011 (34 months)
(3) Project cost Amount paid in Foreign currency Amount paid in Local currency Total Japanese ODA loan portion Exchange rate	 8,374 million yen 3,924 million yen (75,453 million rupiah) 12,297 million yen 9,223 million yen 1 rupiah＝0.052 yen (As of January 1997)	 5,924 million yen 3,231 million yen (318,867 million rupiah) 9,155 million yen 7,454 million yen 1 rupiah＝0.010 yen (Average of the construction period of the Depok depot: 2004 - 2008)

Republic of Indonesia

Ex-Post Evaluation of a Japanese ODA Loan

"North Java Corridor Flyover Construction Project"

External Evaluator: Hideyuki TAKAGI, Ernst & Young Sustainability Co., Ltd.

0. Summary

This project was implemented under the conditions in which the transport capacity had declined along the North Java Corridor and its alternative routes that connect the northern part of Java from east to west, due to bottlenecks caused by traffic congestion at intersections and commercial activity at roadside stalls. The objective of this project is to expand transport capacity and alleviate traffic congestion on the roads by constructing flyovers at six locations, thereby contributing to the economic development of Java by improving the investment climate in the region.

This project is highly relevant to the development policy of Indonesia and development needs, as well as Japan's ODA policy. In terms of effectiveness, the project has contributed to the alleviation of traffic congestion: the average time to pass an intersection has been substantially reduced at the all locations where the flyovers were constructed. The qualitative effects of the project have been seen in the improvement of safety and convenience. As for the impacts, there seems to be no increase in the traffic volume of trucks at these locations. However, economic effects have become apparent to some extent, in that a contribution to more convenient transportation at a ferry terminal which connects Java and Sumatra has been observed. With all these facts taken into consideration, the project effectiveness and impacts are considered to be high. Due to the price rise in construction materials, the project costs significantly exceeded the plan. As a result, the project outputs were reduced by half, and flyovers were constructed at three locations (Merak, Balaraja, Geban). The project period also exceeded the plan; therefore the efficiency of the project is low. The sustainability is considered to be fair because maintenance of the flyovers at Merak and Balaraja had not been implemented as scheduled, and there is room for improvement in the technical aspects of maintenance of the drainage system of the flyovers. In light of the above, this project is evaluated to be partially satisfactory.

1. Project Description

Project location (FO: Flyover)

A distant view of Merak flyover

1.1 Background

The transportation system in Indonesia has been largely depending on roads for both passenger and cargo; therefore, the expansion of the road network has been an important policy for the transportation sector. As a result, both the transport capacity and extension of the road network were expanded rapidly for upwards of ten years until the time of project appraisal. The development of the road network was also a priority agenda item for economic development in the national medium-term development plan at the time of project appraisal. In particular, the North Java Corridor is a main road that supports the economic activities of the country. The road connects the large industrial cities (Jakarta, Surabaya etc.) in the northern part of Java from east to west, where many companies and factories, including Japanese ones, are located. However, the transport capacity of the road had been reduced along with the increase in traffic volume due to the importance of this road, as mentioned above, and traffic congestion spots along the road hindered smooth traffic flows. Therefore, the transportation sector was listed in the plan for expansion of the traffic capacity of the North Java Corridor as one of the targets at the time of project appraisal.

Under the circumstances, the Ministry of Public Works implemented a feasibility study (hereinafter referred to as the F/S) aiming to expand transportation capacity and alleviate traffic congestion along the road by constructing flyovers where bottlenecks which were caused by traffic congestion at the intersections of the road and railroad as well as commercial activity at roadside stalls existed. In the F/S, 14 locations were selected as the most congested points and then studied, based on traffic censuses and requests from the surrounding areas. The special assistance for project formulation (hereinafter referred to as SAPROF) by the Japanese International Cooperation Agency (hereinafter referred to as JICA) followed the F/S. Based on the needs and feasibility of each plan, it was agreed with the Government of Indonesia to select six locations, Merak, Balaraja, Nagreg, Gebang, Peterongan and Tanggulangin, as the targets for

road development by ODA loan project.

1.2 Project Outline

The objective is to increase transport capacity and alleviate traffic congestion by constructing flyovers at six locations along the North Java Corridor and on its alternative routes, thereby contributing to the economic development of Java by improving the investment climate in the region.

Loan Approved Amount / Disbursed Amount	JPY 4,287 million/JPY 2,880 million
Exchange of Notes Date / Agreement Signing Date	March 2005 / March 2005
Terms and Conditions	Interest Rate: 0.4% Repayment Period: 40 years (Grace Period: 10 years) Condition for Procurement: Tied (Special Terms for Economic Partnerships (STEP))
Borrower / Executing Agencies	Republic of Indonesia / Directorate General of Highways (DGH), Ministry of Public Works
Final Disbursement Date	July 2011
Main Constructors (Over 1 billion yen)	PT. Waskita Karya (Indonesia) / Tokyu construction Co., Ltd. (Japan) (JV)
Main Consultants (Over 100 million yen)	PT. Virama Karya (Indonesia) / PT. Binatama Wirawredha Konsultan (Indonesia) / PT Hasfarm Dian Konsultan (Indonesia), PT. Indec Internusa (Indonesia) / PT. Pola Agung Consulting (Indonesia) / PT. Anugerah Kridapradana (Indonesia) / Katahira & Engineers International Inc.(Japan) (JV)
Related Studies (Feasibility Study) etc.	Feasibility study for the North Java Corridor flyover project (F/S) (Ministry of Public Works, Indonesia, 2003) Special Assistance for Project Formulation (SAPROF) (2004) Detailed Design Study for the North Java Corridor Flyover Project (Detailed Design: D/D) (2006)
Related Projects	N/A

2. Outline of the Evaluation Study

2.1 External Evaluator

Hideyuki TAKAGI (Ernst & Young Sustainability Co., Ltd.)

2.2 Duration of the Evaluation Study

Duration of the study: January 2014 – November 2014
Field study: April 14 – May 10, 2014 and August 25 – September 6, 2014

3. Results of the Evaluation (Overall Rating: C[1])

3.1 Relevance (Rating: ③[2])

3.1.1 Relevance to the Development Policy of Indonesia

1) Relevance to the national development policy

During the time from the project appraisal to this ex-post evaluation, the development of the road infrastructure has been a priority agenda item in both the national medium-term development plan and the country's economic policy of Indonesia. At the time of project appraisal, development of the infrastructure was one of the priority sections in the national medium-term development plan (2004 – 2009) in which the extension of the road network was promoted as a means of achieving 6–7% annual average economic growth. In addition, the comprehensive economic policy at that time stated that development of the infrastructure in areas where the economic potential was high was the development target of the transportation sector. At the time of the ex-post evaluation, the national medium-term development plan (2010 – 2014) is promoting the strengthening of traffic and transportation systems and the network formed by the four major cities, including Jakarta and Surabaya, in its priority development target in the infrastructure section. In addition, the master plan for the acceleration and expansion of economic development (2020 – 2025) puts emphasis on the development of the infrastructure (especially electric power and transportation) as the basis of economic development.

2) Relevance to the sector development policy

At the time of both project appraisal and this ex-post evaluation, plans for the country's transportation sector and the Ministry of Public Works have included the improvement of the North Java Corridor. In the government's activity plan in 2005, the expansion of the transport capacity of the North Java Corridor was listed in the targets of the transportation sector. In addition, number 53 of the direction of the Minister of Transport issued in 2000 indicated a policy of having crossings with an overpass or underpass at railroad intersections. At the time of ex-post evaluation, the strategic plan of the Ministry of Public Works (2010 – 2014) is promoting the development of the national roads including the construction of the flyovers in this project in its Java Island road plan, aiming at the construction of a reliable, unified and sustainable road network for the purpose of economic growth and social development.

With respect to the policy regarding the construction of an overpass or underpass at railroad

1 A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory
2 (3): High, (2): Fair, (1): Low

intersections, however, only one location (Merak) meets the conditions since the project was implemented at two other locations (Balaraja and Geban) without consideration for this policy.

3.1.2 Relevance to the Development Needs of Indonesia

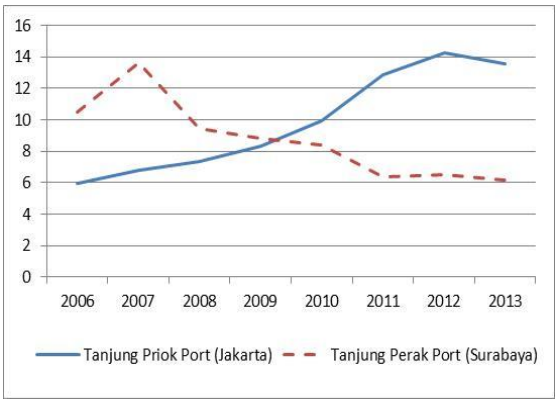
3.1.2.1. Development needs of the North Java corridor as a whole

From the time of the project appraisal to the ex-post evaluation, the North Java Corridor has supported the country's economic activity as a main road that connects the large industrial cities (capita city of Jakarta, the second largest city of Surabaya, etc.) in the northern part of Java from east to west, where many companies and factories, including Japanese ones, are located. The transport capacity of the road had declined due to the increase in traffic volume and bottlenecks caused by traffic congestion at intersections and commercial activity at roadside stalls. Under this situation, it was expected that flyovers would be constructed along the road to expand transport capacity and alleviate traffic congestion. At this ex-post evaluation, the development needs of the North Java Corridor as a whole were reviewed by analyzing the "current situation of the major industrial cities in Java Island" and the "changes in the traffic volume of the North Java Corridor", for the purpose of examining whether its role as a main road connecting the northern part of Java from east to west has been maintained.

1) Present condition of the major industrial cities in Java Island

According to the data of "cargo handling in major international ports" by Indonesia Statistics Bureau, exports from Jakarta have been increasing, whereas those from Surabaya have been decreasing. In addition, industrial parks seem to be spreading centered on the Jakarta metropolitan area if you look at a distribution map in each province of Java Island. From this point of view, it is considered that economic activity in Java Island has been concentrated on the Jakarta metropolitan area.

(Unit: Million ton)



Source: Indonesia Statistics Bureau (BPS)

Figure 3.1-1 Trends in cargo handling at the major international ports

2) Changes in the traffic volume of the North Java Corridor

The traffic volume of the North Java Corridor was observed for the road sections where the flyovers were constructed. According to this, the traffic volume has increased about 1.7 times at Merak, about 4.4 times at Balaraja and 1.2 times at Gebang from the time of project appraisal in

2003 to ex-post evaluation in 2013. While the rate of increase is different for each location, the greatest increase in traffic volume was seen at Balaraja, which is located near Jakarta.

Table 3.1-1 Comparison of the volume of traffic at the time of appraisal and Ex-post evaluation

(Unit: Number of vehicles/day)

	Baseline at the project appraisal (2003)	Actual traffic at the ex-post evaluation of the project (2013: 1 year after completion)	Increase	% increase from 2003
	(a)	(b)	(b) – (a)	(b) / (a)
Merak	8,901	14,942	6,041	167%
Baralaja	11,928	52,268	40,340	438%
Geban	25,035	29,909	4,874	120%

Source: Inter-urban Road Management Central System Database (IRMS) of the DGH, Ministry of Public Works and calculation by the external evaluator

3.1.2.2. Development needs of the locations of the three flyovers

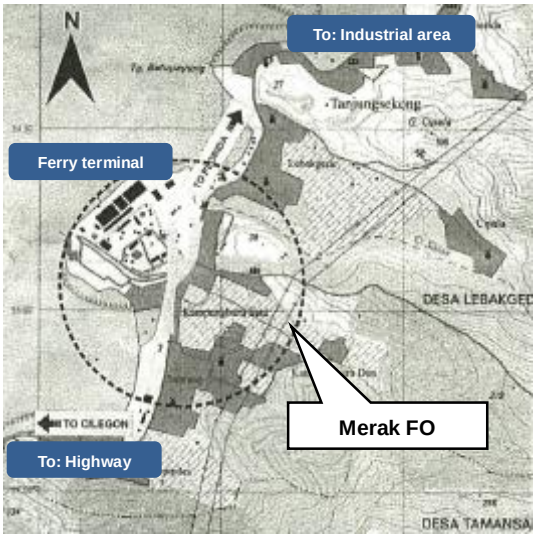
As mentioned above, it is considered that economic activity in Java Island has been concentrated on the Jakarta metropolitan area. Changes in the traffic volume along the North Java Corridor reflect this situation, and the rate of increase is higher at Balaraja among these project sites. In addition, while the improvement of the North Java Corridor has been promoted as its capacity and functions are reaching their limit due to its geographical importance, the construction of the "Trans-Java Toll Road" was already ongoing at the time of the project appraisal for the purpose of complementing the functions of this main road connecting Java Island from east to west[3]. With these points taken into consideration, an analysis was conducted on the development needs of the three locations where the flyovers were constructed at the ex-post evaluation, in addition to the analysis on the role of the North Java Corridor as a main road connecting the northern part of Java Island from east to west. As a result of the analysis, it is concluded that the need for the alleviation of traffic congestion has been high at each location, therefore the development needs of the project has been maintained.

1) Location of the Merak flyover

The Merak flyover has entrances at a ferry terminal in a port located at the west end of the Trans-Java Toll Road and at a road connecting to an industrial area along the coast (Refer to Figure 3.1-2).

[3] At the time of the project appraisal, development of the Trans-Java Toll Road had been delayed due to the slow economic recovery from the Asian financial crisis.

The flyover is one-way traffic from the two entrances at the ferry terminal and the road from the industrial area, and after the junction it connects to the North Java Corridor headed to the entrance of the toll road in Merak. The traffic at the location of the Merak flyover consists mainly of vehicles using the ferry between Java and Sumatra or the comings and goings to the industrial area. Traffic congestion before the construction of the flyover had adversely affected the area especially by hindering the convenience of the ferry users; therefore the development needs for this project are considered high.

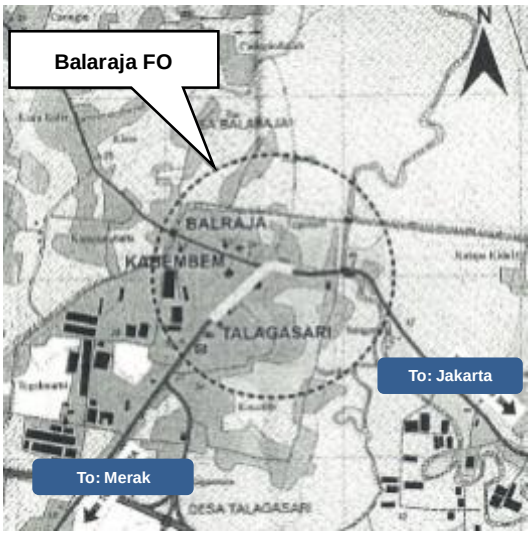


Source: JICA internal material

Figure 3.1-2 Sketch map of Merak FO

2) Location of the Balaraja flyover

The Balaraja flyover is located at an intersection of the North Java Corridor and a road connecting to it, and it runs along the North Java Corridor with two-way traffic (refer to Figure 3.1-3). To complement the functions of the North Java Corridor, the Trans-Java Toll Road for this section was already constructed before the implementation of this project. Despite the toll road, the traffic volume of the North Java Corridor at this section has increased substantially in comparison to that at the time of the project appraisal. The area surrounding the location of the flyover is near Jakarta and there are many industrial parks, thus it is considered that the number of cargo trucks coming and going between the toll road and industrial parks and/or between factories around the area has risen and local traffic has also expanded due to the development of the surrounding area and the population increase. It is therefore considered that the development needs at this location are high from the viewpoint of the alleviation of traffic congestion due to the increase in local traffic.



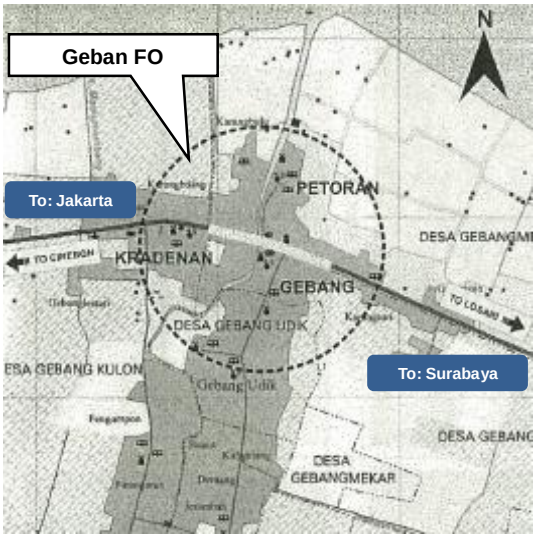
Source: JICA internal material

Figure 3.1-3 Sketch map of Balaraja FO

3) Location of the Geban flyover

The Geban flyover is located on the north Java coast connecting Jakarta and Surabaya (refer to Figure 3.1-4). The Trans-Java Toll Road for this section was already constructed before the implementation of this project, as with the Balaraja flyover. However, since the toll road has still only been partially opened, vehicles going the northern part of Java from east to west need to use the North Java Corridor even if they use the toll road at this section. Therefore, it seems that the convenience and merit of using this part of the toll road is not high. Furthermore the toll rate is set high, thus not many vehicles choose to use this section of the toll road, whereas the traffic volume on the North Java Corridor has increased to 120% from the time of the project appraisal.

In terms of the increase in the volume of local traffic, the volume generated in the Geban area seems not to be so high from the situation of its surrounding area, unlike Merak and Balaraja where there is a ferry terminal or industrial parks nearby. On the other hand, it is considered that the role of the North Java Corridor as a main road connecting the northern part of Java from east to west has been maintained because the convenience of the toll road is not high yet, therefore the development need for this project is high.



Source: JICA internal material

Figure 3.1-2 Sketch map of Gebang FO

3.1.3 Relevance to Japan's ODA Policy

As the basic policy of Japanese ODA towards Indonesia, the Country Assistance Policy for Indonesia (2004) stated that "sustainable growth led by the private sector" was one of its priority areas, and listed the "development of the economic infrastructure" for the improvement of the investment environment as one of the supporting measure. The project is for the development of the basic infrastructure in the transportation sector and it was therefore relevant to the Japan's Country Assistance Policy for Indonesia at the time of the project appraisal.

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

3.2 Effectiveness[4] (Rating: ③)

At this ex-post evaluation, the external evaluator re-examined the effectiveness and impact indicators based on the project effects assumed at the appraisal. With respect to the quantitative effect, the "average time needed to pass the intersections" was set as the most important indicator to examine the project's contribution to alleviating traffic congestion. For the qualitative effect and impact, the improvement of safety and convenience and the "increase in the volume and amount of cargo transportation" are regarded as important indicators, respectively.

3.2.1 Quantitative Effects (Operational and Effect Indicators)

Indicator 1: "Average time needed to pass the intersections"

This indicator was not set at the project appraisal but newly added through the re-examination of indicators at the ex-post evaluation. For this reason, no baseline or target for the indicator had been set before the project implementation. At the ex-post evaluation, the rate of time saving was examined for the average time needed to pass the intersections at each location of the flyover. The benchmarks for evaluation were 1) whether vehicles can pass the flyover without traffic congestion and 2) whether vehicles can pass the intersection under the flyover in around a few minutes without excessive traffic congestion. A comparison was made of the time needed to pass the intersections between the time of the project appraisal and ex-post evaluation, based on the information gathered by the beneficiary survey. Replies to the survey were weighted and the average time to pass the intersections was compared separately for peak hours and normal hours.

According to the results of the beneficiary survey[5], the average time needed to pass the intersection was more than 1 hour at peak hours and more than 30 minutes at normal hours at each location before the construction of the flyovers as shown in Table 3.2-1. After the construction, there has been no traffic congestion on the flyovers; therefore vehicles can pass there at the normal driving speed. Under the flyovers, it takes around 30 to 40 minutes at peak hours and around 10 to 20 minutes at other times. In addition, the situation at the site visited during the ex-post evaluation (as of April 2014) was better somehow than the results of the beneficiary survey at each location: during normal hours, vehicles were going slow or it took a

[4] The evaluation results of the project impacts are incorporated into the Effectiveness rating.

[5] (Beneficiary survey) Target groups: residents, administrative facilities such as schools, hospitals and police offices, and companies at the project sites or in the surrounding area. Survey objectives: time to pass the intersection (before and after the construction of flyovers), improvement of safety, convenience and environment of the roadside (improved or worsen), other positive and negative impacts. Number of samples: around 40 at each location covering the surrounding area widely; total of 121 samples from the 3 location (89 from residents (74%), 21 from administrative facilities (17%), 11 from companies (9%). Methodology: a local assistant asked the questions and wrote down the answers on the questionnaire.

few minutes to pass the intersections. In conclusion, the "average time needed to pass the intersections" at each location has been shortened considerably by the construction of the flyovers.

Table 3.2-1 Comparison of the average time needed to pass the intersections (under the flyovers) before and after the construction of the flyovers

(Unit: Minutes)

	Before the construction of the flyover	Average time needed to pass the intersections under the flyover		
		After the construction of the flyover	Reduction in the time	% of time reduced
	(a)	(b)	(c) = (a) - (b)	(d) = (c) / (a)
Merak:				
During the peak hours (about 2.4 h/day)	104	29	75	72%
Normal hours	40	9	31	78%
Balaraja:				
During the peak hours (about 2.0 h/day)	82	41	41	50%
Normal hours	36	18	18	50%
Gebang:				
During the peak hours (about 2.9 h/day)	100	46	54	54%
Normal hours	48	18	30	63%

Source: Calculation based on the results of beneficiary survey (weighted average of the replies for the time to pass the intersection and the length of the peak hours)

It is observed, however that the roads under the flyovers are still crowded, and traffic congestion still occurs during peak hours. In particular, traffic congestion is observed during the peak hours at Balaraja and Geban, caused by the lines of commercial vehicles such as mini buses waiting for passengers and the fish market opening during noon, respectively. Regarding the situation at Balaraja, countermeasures should be taken to ensure smoother traffic flows, such as by setting up bus stops, guiding the drivers to wait for passengers a certain distance away from intersections and controlling the parking of vehicles around the intersections. Regarding the situation at Geban, this is expected to become better if a plan for moving the fish market is implemented. According the local government that is proceeding with the plan, it is now seeking a contractor capable of implementing the moving of the fish market. Although it is not certain about the completion of the moving of the fish market, there has been land secured along the road and the local government intends to find a contractor and implement the plan

immediately. The traffic condition at Merak is not as crowded as it is called traffic congestion at the time of the ex-post evaluation.

Photo 1. Trucks with heavy loads passing over the flyover (Balaraja FO)

Photo2. Traffic congestion under the Geban flyover (the line of vehicles extends from the fish market ahead)

Indicator 2: "Average volume of traffic per day"

At the time of the ex-post evaluation, the traffic volume at the 3 locations achieved the target as shown in Table 3.2-2 (the target was calculated using an expected rate of increase of 40%[6]). The levels of achievement at each location are 120% at Merak, 313% at Balaraja and 85% at Geban.

Table 3.2-2 Comparison of the volume of traffic per day at the time of the appraisal and ex-post evaluation

(Unit: Number of vehicles/day)

	Baseline at The project appraisal (2003)	Target (3 years after project completion)	Actual traffic at The ex-post evaluation (2013: 1 year after project completion)	Achievement of the target
	(a)	(b) = (a) × 140%	(c)	(c) / (b) × 100%
Merak	8,901	12,461	14,942	120%
Baralaja	11,928	16,699	52,268	313%
Geban	25,035	35,049	29,909	85%

Source: IRMS of the DGH, Ministry of Public Works and calculation by the external evaluator

Aside from the achievement of the target, there has been no substantial increase in the traffic volume in comparison with the situation before and after the construction of the flyovers. As shown in Table 3.2-3, the traffic volume has slightly increased at Merak to 1.1 times and stayed

6 At the project appraisal, the target for the traffic volume was set based on the baseline data of 2013, and 140% of the baseline was assumed as the target 3 years after completion of the project. However, since the baseline data was not correct, the target was recalculated using the correct data, and 140% of the correct baseline was set as the target.

almost the same at Balaraja and Gebang, from the time before the construction (2010) to the ex-post evaluation (2013). It is considered that the increase in the traffic volume has not been as a result of the project, but is the natural increase by external factors, since it had already been increasing before the construction of the flyovers.

Table 3.2-3 Comparison of the traffic volume before and after the construction of the flyovers

(Unit: Number of vehicles/day)

	Traffic before the construction of the FO (2010)	Actual traffic at The ex-post evaluation (2013: 1 year after project completion)	Increase	% increase from 2010
	(a)	(b)	(b) – (a)	(b) / (a)
Merak	13,106	14,942	1,836	114%
Baralaja	51,019	52,268	1,249	102%
Geban	28,823	29,909	1,086	104%

Source: IRMS of the DGH, Ministry of Public Works and calculation by the external evaluator

3.2.2 Qualitative Effects

Information on the project's qualitative effects was gathered by the beneficiary survey conducted at each location of the flyovers.

1) Improvement of safety

According to the results of the beneficiary survey, most respondents including the residents feel there have been an improvement in safety since the construction of the flyovers at all the project locations (93% at Merak, 88% at Balaraja and 95% at Gebang). The respondents stated that the number of traffic accidents at the intersections had decreased compared to before the construction of the flyovers.

2) Improvement of convenience

According to the results of the beneficiary survey, most respondents including the residents feel that there has been an improvement in convenience after the construction of the flyovers at all the project locations (95% at Merak, 90% at Balaraja and 90% at Gebang). The respondents stated that as the crowded situation there had improved, both cars and pedestrians could easily go through the intersection.

3) Improvement of the roadside environment (mitigation of noise, air pollution, etc., caused by traffic congestion)

According to the results of the beneficiary survey, most respondents including the residents do not consider there has been much improvement of the environment along the road after the construction of the flyovers at all the project locations (improvement of noise: 35% at Merak, 18% at Balaraja and 7% at Gebang; improvement of vibration: 33% at Merak, 15% at Balaraja and 10% at Gebang; improvement of air pollution: 18% at Merak, 18% at Balaraja and 15% at

Gebang). It is considered that these replies from the respondents concerning the roadside environment relate to the increase in traffic volume such as cargo trucks at each location compared to before, rather than any inadequacy of the construction of the flyovers to generate environmental improvements. (Refer to the section on “Other Positive and Negative Impacts”).

3.3 Impact

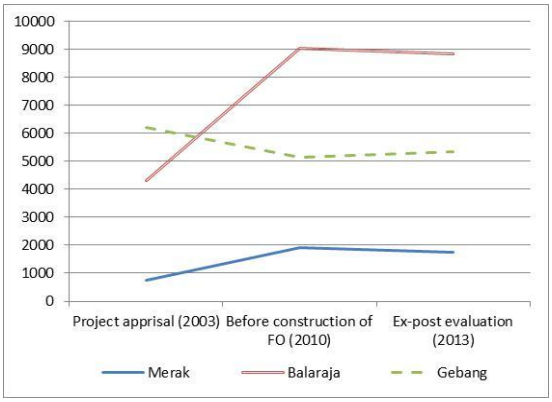
3.3.1 Intended Impacts

1) Economic effects from the improvement of cargo transportation

Indicator 1: “Increase in the volume and amount of cargo transportation”

Since no information was obtained regarding the volume and amount of cargo transportation, as an alternative, an analysis was conducted on changes in the volume of truck traffic. From the time of the project appraisal (2003) to the ex-post evaluation (2013), the volume of truck traffic has increased considerably at Merak and Balaraja by more than two times, whereas that at Gebang it has slightly decreased. In the comparison before and after the construction of the flyovers, however, the volume of truck traffic has decreased slightly at Merak and stayed almost the same at Balaraja and Gebang. In other words, there has been no substantial increase in the volume of truck traffic after the construction of the flyovers.

(Unit: Number of vehicles/day)



Source: IRMS of the DGH, Ministry of Public Works

Figure 3.3-1 Trends in the volume of truck traffic

With respect to the economic effects due to improvements to cargo transportation, an analysis was also conducted of the improvement in convenience when using the ferry terminal at Merak. Since the construction of the Merak flyover, traffic congestion around the entrance has been greatly alleviated.

Photo 3. Merak ferry terminal (The FO contributes to the movement of goods and people between Java and Sumatra)

As shown in Table 3.3-1, the number of vehicles using the ferry terminal has been increasing, and the improved traffic conditions have contributed to improving convenience for the movement of goods and people. The traffic congestion alleviated by the project has contributed especially significantly to the improvement of cargo transportation between Java and Sumatra, since almost half of the vehicles using the ferry terminal are trucks.

Table 3.3 -1 Trends in the number of vehicles using the ferry terminal

(Unit: Number of vehicles/year)

	2010	2011	2012	2013
Passenger cars	269,296	286,977	299,847	299,653
Buses	609,112	655,026	696,965	695,941
Trucks	895,264	1,022,722	1,049,140	1,013,757
Total	1,773,672	1,964,725	2,045,952	2,009,351

Source: A ferry company "PT. ASDP Indonesia Ferry"

Indicator 2: "Increase in the number of corporations in the nearby industrial cities and the amount of investment"

This indicator was excluded from the analysis of the project's impact for the following reasons. For the purpose of complementing the functions of a main road connecting Java Island from east to west, the construction of the Trans-Java Toll Road had already been proceeding; therefore the construction of the flyovers is not strongly related to the increase the number of corporations in the nearby industrial cities and the amount of investment.

2) Impacts from the improvement of safety

Indicator 1: "Decrease in the number of traffic accidents"

The data on the number of traffic accidents could not be obtained because the local police office does not record this information. Therefore, a decision was made for this indicator to be assessed based on the information gathered by the beneficiary survey. According to this information, it seems that the number of traffic accidents has decreased since the construction of the flyovers at all three locations (% of replies to the question "traffic accidents have decreased" were 95% at Merak, 88% at Balaraja, 98% at Gebang).

3.3.2 Other Impacts

1) Impacts on the Natural Environment

According to the environmental monitoring[7] conducted after the completion of the project, no specific issues were reported regarding air pollution, noise and vibration. Although negative

[7] Source: JICA internal material

results were reported on the examination of water quality in nearby rivers and waste water conducted during the monitoring, these were caused by industrial effluent. The monitoring report concluded that there were no environmental impacts from the project.

2) Land Acquisition and Resettlement

As it is shown in Table 3.3-2, the number of houses moved by the resettlement increased compared to the plan of the project in all three locations. The factors that caused this increase are the changes in the specification from 1 to 2 bridges at Merak (Refer to the Efficiency section) and a population increase along the road at Balaraja and Gebang. According to the interviews with the residents at the project sites, there were no specific issues in the process of land acquisition; therefore there was no negative impact on the residents moved by this project. Regarding the scale of land acquisition, it was almost as planned except for Merak for which the specifications for the flyover were changed. At Balaraja, a part of the school site adjoining the intersection was subject to land acquisition. According to a teacher at the school, it has secured a sufficient number of class rooms by constructing a school building on the school site, utilizing the sufficient amount of compensation provided by the land acquisition.

Table 3.3-2 Comparison between the plan and the actual situation of resettlement and land acquisition

	Resettlement (number of houses)			Land acquisition (m²)		
	Plan	Actual	Difference	Plan	Actual	Difference
Merak	8	88	80	891	3,151	2,260
Balaraja	15	35	20	2,621	2,140	-481
Geban	23	98	75	3,929	3,928	-1

Source: JICA internal material

3) Unintended Positive/Negative Impact

In the beneficiary survey, complaints from the residents in the surrounding areas were heard at all three locations about exhaust gas and dust that are considered to be caused by the increase in traffic volume and the drainage system of the flyovers, which has not functioned well. Regarding the air pollution, it is not considered as an impact of the flyovers because the traffic volume had largely increased before the construction (Refer to the Sustainability section for the function of the drainage system). At Balaraja, it was pointed out by the school adjoining the intersection that the speed of vehicles is higher when they pass the flyovers, which causes a danger for school children when they cross the road on the way to school. Countermeasures should be taken to cope with such a situation, such as setting up pedestrian crossings and signs and giving a safety education to the school children.

As described above, the project has contributed to shortening the average time to pass the intersection and has improved convenience and safety. As for the impacts, it has contributed to an increase in the number of vehicles using the ferry terminal and a decrease in the number of traffic accidents. With all these facts taken into consideration, it is concluded that this project has largely achieved its objectives. Therefore its effectiveness and impact is high.

3.4 Efficiency (Rating: ①)

3.4.1Project Outputs

1) Construction work

The outputs of the project were reduced from the construction of flyovers at the originally planned six locations to the three locations of Merak, Balaraja and Geban. The reasons for excluding the other planned three locations were the significant price rise in construction materials, unsuccessful biddings due to the high bid prices and volcanic activity (Refer to Table 3.4-2). The specifications for the flyovers at the implemented three locations are as follows, which were finalized through the detailed design study for the North Java Corridor flyover project (hereinafter referred to as D/D) during the project period. The design of the Merak flyover was originally planned as one bridge but was changed to two bridges. The final designs for the other two locations are almost the same as the original plan.

Table 3.4-1 Specifications for the flyovers

Pkg. 1	Merak 1	railroad intersection	Length of bridge: 345m, lanes: 1~2 (width: 6.75~11.17 m), PC・steel gilder
	Merak 2	railroad intersection	Length of bridge:145m, lanes: 1 (width: 7 m), PC・steel girder
	Balaraja	road intersection	Length of bridge: 221m, lanes: 2 (width: 13 m), PC・steel girder
Pkg. 2	Geban	non-intersection	Length of bridge: 385m, lanes: 2 (width: 9m), PC・steel girder

Source: JICA internal material

Out of the originally planned six locations, construction of the flyovers at the three locations of Nagreg, Peterongan and Tanggulangin were canceled for the following reasons and excluded from the project scope.

Table 3.4-2 Reasons for the cancellation of the three flyovers

Nagreg	The main reason of the cancellation of the Nagreg flyover was the sharp price increase in construction materials, especially steel, oil-related products, cement, etc. The total construction costs for five flyovers exceeded the loan amount (excluding Tanggulangin, which had already been excluded from the project's targets).
Peterongan	There was no bid submission on the rebidding process for this flyover. As it became difficult to implement the project within the loan period, the executing agency decided to exclude this location from the project's targets and to implement it under the national

	budget for 2011. (The construction of Peterongan was completed by the time of this ex-post evaluation.)
Tanggulangin	A mud flow volcano has been active since May 2006 in the Sidoarjo Regency, where the planned site of the Tanggulangin flyover was located. Due to the effects from the eruption, this location was excluded from the project at the bidding stage of the implementation.

Source: JICA internal material

2) Application of the special terms for economic partnership

In this project, there were problems caused by the effort fulfilling the requirement under special terms for economic partnership (hereinafter referred to as STEP): the construction cost increased compared to that without applying STEP; some bidding was unsuccessful because there was no tender from Japanese companies, and the construction of the flyovers was cancelled. The department in charge of overseas cooperation of the executing agency points out that from the technical point of view, the necessity for the application of STEP was relatively low in the case of constructing a small scale flyover like this project; therefore an application for a general untied loan was preferable. In addition, it states opinions for the future implementation of a project applying STEP. It is expected that, in the process of procurement, the requirements for the participation in bidding are relaxed so that more Japanese contractors can tender, and in the process of the construction work, the office procedures are more flexible.

3) Consulting services

Among the originally planned consulting services, the detailed design of the flyovers was excluded since it was prepared with the budget from JICA (D/D completed in December 2006). The other consulting services were implemented as planned.

3.4.2 Project Inputs

3.4.2.1 Project Costs

Comparison of the project costs was made for the construction work and consulting services of the three completed flyovers. Details of the planned and actual project costs are as follows. The actual project cost of 2,880 million yen was significantly higher than the plan of 1,895 million yen (152% of the planned costs). The main reason that the actual costs exceeded the planned costs was a sharp price increase in construction materials.

Table 3.4-3 Comparison of the planned and actual project costs

(Unit: Million yen)

Component	Plan (total of 3 FOs)			Actual (total of 3 FOs)			Difference
	Foreign	Domestic	Total (a)	Foreign	Domestic	Total (b)	(b) – (a)
Construction work:							

Pkg. 1 (Merak & Balaraja)	313	652	965	437	1,184	1,621	656
Pkg. 2 (Geban)	312	329	641	332	613	944	303
Sub-total	625	981	1,606	769	1,797	2,565	959
Consulting services	—	—	*289	184	131	315	26
Total	—	—	**1,895**	**953**	**1,928**	**2,880**	**985**

Source: JICA internal material

Notes: The sum for the construction work and consulting services of the planned and actual amounts were compared since information on the actual costs for administration and land acquisition was not obtained. / * The planned cost of the consulting services for the three flyovers above was calculated by dividing the total amount proportionally based on the ratio of the construction work costs for each flyover.

3.4.2.2 Project Period

The actual period[8] of the project as a whole was 85 months, which exceeded the plan of 63 months (135% of the planned period). The planned and actual project period are compared in Table 3.4-4 below. The start of the construction work was delayed for 17 months, mainly due to unsuccessful bidding as an effect of a sharp price rise in construction work, and the long time taken for the office procedures to approve the bidding results and the contracts as well. After the start of the construction work, the transfer of underground facilities at the project sites and the insufficient capacity of the contractors caused 5 months of delay until the completion.

Table 3.4-4 Comparison of the planned and actual project periods

Step	Plan	Actual	Difference (cumulative delay in months)
L/A signing date	March 2005	March 2005	No difference
Start of construction	June 2008	November 2009	17 months
Completion of construction	May 2009	March 2011	22 months
End of warranty period	May 2010	March 2012	22 months
Total period in months	63 months	85 months	22 months

Source: JICA internal material

3.4.3 Results of Calculations of the Internal Rates of Return (Reference only)

Financial Internal Rate of Return (FIRR)

The project does not relate to an increase in income as a financial benefit from the investment. Therefore, the calculation of the FIRR was excluded from the appraisal and the ex-post evaluation of this project.

Economic Internal Rates of Return (EIRR)

Recalculation of the EIRR was made at the time of the ex-post evaluation, based on the

[8] The completion of this project is defined as the end of the warranty period after 1 year from the completion of the construction work.

actual project costs and the difference between the annual average traffic volume and the planned target[9]. As a result, the recalculated rate far exceeds that at the time of the appraisal for Balaraja, where the annual average of traffic volume has increased significantly. On the other hand, the recalculated rates of Merak and Gebang are almost equal to the social discount rate indicated by international agencies for general public works, which range from 10 - 12%, mainly because the project costs exceeded the plan.

Table 3.4-5 Comparison of the planned and actual EIRR

	Appraisal	Ex-post evaluation	Notes
Merak	15.08%	about 12%	The annual average traffic volume was 120% of the target; however the project cost far exceeded the plan due to the change of the specifications to two bridges. As a result, the recalculated rate is lower than that at the appraisal.
Balaraja	29.24%	about 170%	The annual average traffic volume was more than 300% of the target, whereas the increase in the project cost was relatively small. As a result, the recalculated rate far exceeded that at the appraisal.
Geban	15.12%	about 10%	The annual average traffic volume was lower than the target (85%) and the project cost was higher than the plan. As a result, the recalculated rate is lower than that at the appraisal.

Source: JICA internal material (appraisal), re-calculation by the evaluator (ex-post evaluation)

The project period exceeded the plan, and the project cost 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

1) Supervising the operation and maintenance

The operation and maintenance of the national roads is supervised by the Ministry of Public Works as the executing agency of the project. The actual work of the maintenance of roads is undertaken by its local offices at each location of the flyovers. With respect to the institutional aspects of the operation and maintenance of the project, it has been improved in comparison to that at the time of project appraisal because the governance for the Ministry's regional operation has been more systematic as a result of its organizational change as follows, and the staff allocation has been expanded as well. The department in charge of this project has been changed to the Directorate General of Highways from the Directorate General of Regional Infrastructure at the time of the project appraisal. Following the organizational change, it established an "Agency for National Road Implementation" (hereinafter referred to as BBPJN) under a Ministerial regulation in 2010 at 10 locations across the country. These are under the

[9] Approximate recalculated rates are shown here, which reflect only the actual project costs and the annual average traffic volume among the factors for the calculation of the EIRR since some parts of the calculation at the time of the appraisal are not clearly identified.

jurisdiction of the Directorate General of Highways, which oversees the regional operations of the Ministry. The BBPJN undertakes, under the direct control of the Directorate General of Highways, the supervision of the development and maintenance of the national roads. The operation and maintenance of the flyovers at Merak, Balaraja and Geban constructed by this project is supervised by the BBPJN IV, which has jurisdiction over the special capital region of Jakarta and the provinces of West Java and Banten.

2) Implementation of the Maintenance

Among the local offices of the Ministry of Public Works, maintenance of the flyovers is implemented by the Tangerang office for Merak and Balaraja, and by the Cirebon office for Gebang. The local offices outsource the maintenance work of the national roads including flyovers along the roads, and maintenance teams are formed by full-time workers at each local office. According to the BBPJN IV, each local office has a sufficient number of maintenance staff, and there are no specific issues identified in the structural aspects of maintenance.

Meanwhile, regarding the structural aspects of maintenance, Merak and Balaraja flyovers were not cleaned or repaired appropriately at the site visits during the 1st field study as mentioned below in the Current Status of Operation and Maintenance section. The inappropriate maintenance at these flyovers was due to an emergency where the maintenance workers were busy for recovery work. There should be improvement in the structural aspects to avoid shortages of manpower from now on, whenever they need to deal with an emergency.

3.5.2 Technical Aspects of Operation and Maintenance

1) Technical aspects of the maintenance of national roads in general

The maintenance work for the flyovers is conducted in the same manner as for other sections of national roads, which consists mainly of cleaning and the patch repair of damaged road surfaces. According to the local offices of the Ministry of Public Works, there are no specific issues identified in the technical aspects of maintenance of the national roads in general since experienced workers are hired and they take training courses at a training center of the BBPJN IV and in-house training. The local offices control the maintenance teams by obligating them to report the results of the work and the schedule for the next day to the office every day.

2) Technical aspects of the maintenance of the drainage system of the flyovers

As the maintenance of flyovers is different from the maintenance of national roads in general, problems were observed regarding the maintenance of the drainage system of the flyovers during the site visits. Specifically, the lid of the drainage ditch cannot be opened in some places due to damage and curved road surface caused by a large traffic volume of trucks with heavy cargo and patch repair. In addition, there are places where sand had covered the drainage ditch

due to the lack of cleaning, and drainpipes seemed to be clogged with sand. In order to recover the functions of the drainage system, the maintenance methods for flyovers as a whole should be improved by reviewing how to repair damaged road surfaces and how to clean the inside of drainage systems.

Photo5. Road side of Balaraja FO (sand still remains inside the drainage system after cleaning)

Photo6. Patch repair and drainage ditch. The lid of the ditch cannot be opened (Geban FO)

3.5.3 Financial Aspects of the Operation and Maintenance

The budget for the maintenance of the national roads is allocated to the executing agency from the state budget, in which the maintenance of flyovers is included. For the regular maintenance of the national roads, approximately 90 million rupiah (about 800,000 yen) has been allocated per 1 km in the fiscal year 2014, which is spent on inspections, repairs, etc. (Refer to the table 3.5-1). According to the executing agency, the budget allocation has tended to increase, and it is sufficient for regular maintenance. Therefore, it is concluded in this evaluation analysis that there are no specific issues regarding the financial aspects of the operation and maintenance. However, it was also heard that in the case of an emergency where a large amount of the budget needs to be used for recovery work as described in the following section, this sometimes causes restrictions on the budget for regular maintenance of the national roads.

Table 3.5-1 Changes in the budget allocation for the maintenance of national roads

(Unit: Million rupiah)

FO	Road section	Distance (km)	2013	2014	
			Budget allocation	Budget allocation	Per 1 km
Merak	Merak – Cilegon	8.5	510	777	91.4
Balaraja *	Serang – Tangerang	54.14	40,374	24,309	449.0
Geban	Cirebon – Loasi	27.68	2,491	2,555	92.3

Source: The DGH, Ministry of Public Works

Notes: * Among the data provided by the executing agency, the budget amount of Balaraja includes that for the development of roads under conditions of increasing traffic volume. Therefore, there is a large difference in the amount between the above two years.

3.5.4 Current Status of the Operation and Maintenance

Problems were seen at all three flyovers at the site visits, especially Merak and Balaraja where the condition of the cleaning and repairs did not seem sufficient at the time of the 1st field study. The main reason for such inappropriate maintenance was an emergency: in recent years, recovery work has been prioritized to implement measures for flooding and collapsed sediment that occur during the rainy season, and the maintenance teams could not undertake regular maintenance of the roads in accordance with the schedule for a prolonged period of time. Summarizing the interviews with the residents in the surrounding area regarding the operation and maintenance of the flyovers, the road surface seems to be damaged by the passing of trucks with heavy loads when a pool of rain water is on the road surface. The road surface is therefore damaged most during the rainy season, and the malfunction of the drainage system due to inappropriate maintenance is considered one of the causes of the damage. Especially at Balaraja, the road surface was badly damaged near the exit of the flyover. Vehicles had to avoid the damaged points, thus the smooth traffic flow was disturbed. These flyovers are currently being maintained as of the time of the 2nd field study, and the damaged road surface is under pavement construction. The current conditions of each flyover are as follows.

1) Merak flyover:

The road surface is good, whereas there are accumulations of sand on the road side and inside the drainage system. According to the residents in the surrounding area, because of the malfunction of the drainage system pools of rainwater form at the entrance and exit of the flyover. As of the 2nd field study, the maintenance of the flyover has been in process mainly by cleaning, whereas removal of the sand inside the drainage system has not yet been completed.

2) Balaraja flyover:

The road surface is curved and damaged probably due to the large volume of truck traffic carrying heavy loads, and patch repairs for the damage and unrepaired large hollows were identified. In addition, sand has accumulated on the roadside and inside the drainage system. The maintenance condition seems worst among the three flyovers. As of the 2nd field study, the maintenance of the flyover has been in process mainly by patch repair and cleaning of the roadside, and the badly damaged road surface near the exit of the flyover is under pavement construction. However, removal of the sand inside the drainage system has not yet been completed.

3) Gebang flyover:

The condition is similar to that of Balaraja, where the road surface is curved and damaged, and maintained with a patch repair. According to the local office of the Ministry of Public

Works, the lid of the drainage ditch cannot be opened due to the curved road surface and problems in the repairs to the damaged points, therefore the inside of the drainage system cannot be cleaned to remove the sand. As a result, the malfunction of the drainage system causes pools of rain water at the entrance and exit of the flyover in the rainy season.

Some problems have been observed in terms of institutional and technical aspect of operation and maintenance system. Therefore the sustainability of the project effect is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project was implemented under conditions in which the transport capacity had declined along the North Java Corridor and its alternative routes that connect the northern part of Java from east to west. This decline was due to bottlenecks caused by traffic congestion at intersections and commercial activity at roadside stalls. The objective of this project is to expand the transport capacity and alleviate traffic congestion on the roads by constructing flyovers at six locations, thereby contributing to the economic development of Java by improving the investment climate in the region.

This project has been highly relevant to the development policy of Indonesia and development needs, as well as Japan's ODA policy. In terms of effectiveness, the project has contributed to the alleviation of traffic congestion: the average time to pass the intersections has been substantially reduced at all the locations where the flyovers were constructed. The qualitative effects of the project have been seen in the improvement of safety and convenience. As for the impacts, there seems to be no increase in the volume of truck traffic at these locations. However, the economic effects have become apparent to some extent, considering its contribution to convenient transportation at the ferry terminal that connects Java and Sumatra. With all these facts taken into consideration, the project's effectiveness and impacts are considered to be high. Due to the price rise in construction materials, the project cost significantly exceeded the plan. As a result, the project outputs were reduced by half, and flyovers were constructed at three locations (Merak, Balaraja, Geban). The project period also exceeded the plan; therefore the efficiency of the project is low. The sustainability is considered to be fair because maintenance of the flyovers at Merak and Balaraja had not been implemented as scheduled, and there is room for improvement in the technical aspect of maintenance of the drainage system of the flyovers. In light of the above, this project is evaluated to be partially satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agencies

1) To improve the institutional aspects of the operation and maintenance in the case of an emergency

At the Merak and Balaraja flyovers, appropriate cleaning and repairs had not been carried out for a prolonged period of time due to an emergency where the maintenance workers were busy with recovery work that was prioritized to support measures to deal with flooding and collapsed sediment which has occurred during the rainy season in recent years. Not only regarding these two flyovers, there should be improvement in the institutional aspects to avoid a shortage of manpower from now on whenever it is necessary to deal with an emergency. For example, the executing agency can create a system in which each BBPJN forms a team for emergency measures in each jurisdiction area (in the case of BBPJN IV, the special capital region of Jakarta and the provinces of West Java and Banten). Dispatching the emergency team would avoid an excessive burden on the local maintenance teams so that the regular maintenance work can be appropriately managed.

2) To improve the maintenance of the drainage system of the flyovers

There are problems regarding the maintenance condition of the drainage system of the flyovers: the lid of the drainage ditch cannot be opened in some places due to damage, such as a curved road surface caused by a large volume of truck traffic with heavy loads and patch repairs. There are also places where sand covers the drainage ditch due to the lack of cleaning and the drainpipes also seem to be clogged with sand. In order to recover the functions of the drainage system, the maintenance method of the flyovers as a whole should be improved by reviewing how to repair damaged road surfaces and how to clean the inside of the drainage system.

3) Traffic control and safety measures surrounding the flyovers

There are problems regarding the traffic control and safety measures surrounding the flyovers especially at Balaraja. Traffic congestion caused by lines of parked commercial vehicles such as mini buses during the peak hours hinders smooth traffic flows. In addition, the school adjoining the intersection pointed out that the speed of vehicles is higher when vehicles pass over the flyovers, which causes a danger for the school children when they cross the road on the way to school. Countermeasures should be taken by the administrative bodies for traffic control and safety measures surrounding the flyovers. For example, the following measures are expected to cope with vehicles stopping around intersections: the setting up of bus stops, guiding the drivers to wait for passengers at a certain distance away from intersections and controlling the parking of vehicles around intersections, which should be executed in coordination with the local government and police stations, etc. To improve the safety of pedestrians, countermeasures should be taken such as the setting up of pedestrian crossings and signs and giving safety education to the school children, in coordination with the local

government, police stations, schools etc.

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

1) Application of the STEP

In this project, there were problems caused by the effort fulfilling the STEP requirement: the construction cost increased compared to that without applying STEP; some bidding was unsuccessful because there were no tenders from Japanese companies, and the construction of flyovers was cancelled. The department in charge of overseas cooperation of the executing agency points out that from the technical point of view, the necessity for the application of STEP was relatively low in the case of constructing a small scale flyover like this project; therefore an application for a general untied loan was preferred. In addition, it states opinions for the future implementation of projects applying STEP. It is expected that in the process of procurement, the requirements for participation in bidding are relaxed so that more Japanese contractors can tender, and in the process of the construction work, the office procedures should be more flexible.

Based on the suggestions from the counterpart regarding the efficiency of the loan project under the STEP, measures are considered necessary to cope with the high bidding prices and the small number of bidders, with a single bid being typical. In addition, there should be confirmation and agreement regarding the necessity of applying STEP to the future ODA loan project through careful consideration based on the contents and scale of the project objectives together with due consideration of the requirements of the borrower (counterparty government) and the executing agency. For example, a comparative review should be made regarding the application of STEP and general untied loans at the planning stage of a project, from the viewpoint of the financial and cost benefit analysis. The study results are explained to the executing agency and through discussions an agreement is made.

Comparison of the Original and Actual Scope of the Project

Item	Original	Actual
(1) Project Outputs	Construction of flyovers at the following six locations: ・ Merak (railroad intersection) ・ Balaraja (road intersection) ・ Nagreg (non-intersection) ・ Gebang (non-intersection) ・ Peterongan (road intersection) ・ Tanggulangin (railroad intersection)	Construction of flyovers at the following three locations: ・ Merak (railroad intersection) ・ Balaraja (road intersection) ・ Gebang (non-intersection)
(2) Project period	March 2005 – May 2009 (63 months)	March 2005 – March 2012 (85 months)
(3) Project cost Amount paid in Foreign currency Amount paid in Local currency Total Japanese ODA loan portion Exchange rate	 1,441 million yen 4,315 million yen (359,779 million rupiah) 5,756 million yen 4,287 million yen 1 rupiah＝0.012 yen (As of September 2004)	 935 million yen 2,215 million yen (235,048 million rupiah) 3,168 million yen 2,880 million yen 1 rupiah＝0.0094 yen (March 2007 to July 2011, average of the lending period)