Philippines

"Metropolitan Area and Regional Roads Project Evaluation"

Report Date: November 1998
Field Survey: February 1998

Project Summary

Project Name Metro Manila Radial Road No. 10 and Related Roads Project
Metro Manila Circumferential Road No. 3 Construction Project
Metro Manila Circumferential Road No. 5 and Radial Road No. 4 Construction Project
Philippine-Japan Friendship Highway Rehabilitation Project
West and North-West Leyte Road Improvement Project (I)
West and North-West Leyte Road Improvement Project (II)
Regional Tourism Development Roads Project

Project Name	Metro Manila Radial Road No.10 and Related Roads Project (Stage I)	Metro Manila Circumferential Road No.3 Construction Project	Metro Manila Circumferential Road No.5 and Radial Road No.4 Construction Project
Borrower	Philippine Government		
Executing Agency	Department of Public Works and Highways (DPWH)		
Exchange of Notes	July 1983	December 1985	December 1987
Loan Agreement	September 1983	May 1986	January 1988
Final Disbursement Date	February 1994	May 1994	April 1997
Loan Amount	¥5,400 million	¥1,439 million	¥4,837 million
Loan Disbursement Amount	¥2,130 million	¥964 million	¥4,447 million
Loan Conditions			
Interest Rate (annual rate)	3.0 %	3.5 %	3.0 %
Repayment Period	30 years (10 years of grace period)		
Procurement Conditions	General Untied (Partial Untied on Consulting Service Portion)		

Project Name	Philippine-Japan Friendship Highway Rehabilitation Project	West and North-West Leyte Road Improvement Project (I)	West and North-west Leyte Road Improvement Project (II)	Regional Tourism Development Roads Project
Borrower	Philippine Government			
Executing Agency	Department of Public Works and Highways (DPWH)			
Exchange of Notes	April 1988	July 1983	December 1988	December 1988
Loan Agreement	May 1988	September 1983	May 1989	May 1989
Final Disbursement Date	February 1997	December 1991	September 1996	September 1994
Loan Amount	¥ 14,003 million	¥ 6,300 million	¥ 5,500 million	¥ 2,169 million
Loan Disbursement Amount	¥ 13,944 million	¥ 2,944 million	¥ 5,041 million	¥ 2,130 million
Loan Conditions				
Interest Rate (annual rate)	3.0 %		2.7 %	
Repayment Period	30 years (10 years of grace period)			
Procurement Conditions	Untied	General Untied (Partial Untied on Consulting Service Portion)		

Reference

(1) Currency: Peso

(2) Exchange Rate: IFS market annual average rate

Year	1980	1981	1982	1983	1984	1985	1986	1987
Peso/US$	7.511	7.900	8.540	11.113	16.699	18.607	20.386	20.568
Yen/US$	226.74	220.54	249.08	237.51	237.52	238.54	168.52	144.64
Yen/Peso	30.19	27.92	29.17	21.37	14.22	12.82	8.27	7.03

Year	1988	1989	1990	1991	1992	1993	1994	1995	1996
Peso/US$	21.095	21.737	24.311	27.479	25.512	27.120	26.417	25.714	26.216
Yen/US$	128.15	137.96	144.79	134.71	126.65	111.2	102.21	94.06	108.78
Yen/Peso	6.07	6.35	5.96	4.9	4.96	4.1	3.87	3.66	4.15

(3) Exchange Rate: Appraisal/Actual

Project Name	At the time of Appraisal (Yen/Peso)	Actual (Yen/Peso)
Metro Manila Radial Road No.10 and Related Roads Project	30.00	6.66
Metro Manila Circumferential Road No.3 Construction Project	14.00	5.15
Metro Manila Circumferential Road No.5 and Radial Road No.4 Construction Project	7.00	4.27
Philippine-Japan Friendship Highway Rehabilitation Project	7.00	4.29
West and North-West Leyte Road Improvement Project (I)	30.00	7.20
West and North-West Leyte Road Improvement Project (II)	6.30	4.23
Regional Tourism Development Roads Project	6.30	4.67

Note) Actual is weighed average value.

(4) Fiscal Year: January ~ December

(5) Abbreviations:

DPWH	:	Department of Public Works and Highways
R-#	:	Radial Road #
C-#	:	Circumferential Road #
JICA	:	Japan International Cooperation Agency
UTSMMA	:	Urban Transport Study in Metro Manila Area
MMETRO PLAN	:	Metro Manila Transport, Land Use and Development Plan
MMUTIS	:	Metro Manila Urban Transport Integration Study

Introduction

The Japan Bank for International Cooperation (JBIC), with the aim to strengthen its partnership with the Japan International Cooperation Agency (JICA), is conducting joint activities in various fields and at various levels. In the field of post-evaluation, JBIC and JICA have started joint evaluation since fiscal 1996, and the two organizations are working to strengthen our cooperation by collaborating in research and sharing evaluation and other results.

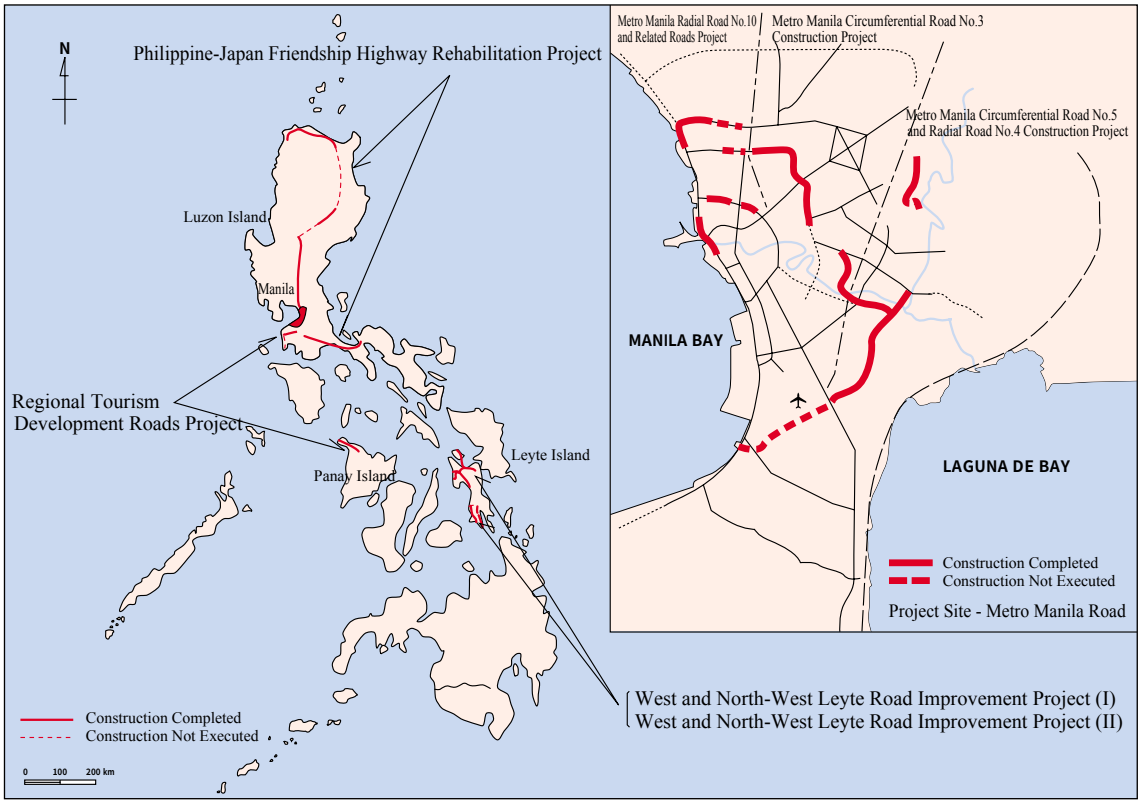
In this post-evaluation study too, the local survey was done in association with JICA, and for the analysis of the project effects and impacts, JICA kindly allowed us to utilize the results of the traffic volume surveys it conducted. In particular, regarding the present status of traffic in Metro Manila, JBIC was allowed to use the data analysis results of the study team currently conducting the Metro Manila Urban Transportation Integration Study (MMUTIS) for Metro Manila.

This report was compiled by JBIC Post-evaluation Group while incorporating the views of Mr. Kusakabe, the JICA Expert, currently on dispatch from JICA to Department of Public Works and Highways (DPWH) of the Government of Republic of the Philippines, who kindly accompanied us on this local survey, as well as the views of Mr. Hakamada, Assistant Manager of the Division, Hanshin Expressway Public Corporation, who was also a member of this survey mission.

This post-evaluation study covered 3 projects in Metro Manila and 4 projects in the rural regions, thus a total of 7 projects, implemented as ODA loan projects in the Philippines. These 7 projects were implemented in a period of major changes in the Philippines, from 1985 to 1997 in the nation's politics, economy, and society, in terms of a transition in political power, the devaluation of the currency, and succession of natural disasters.

By conducting a post-evaluation of several projects implemented in parallel during such a period in the metropolitan area and in the rural regions, we were able to confirm that the above-mentioned common external factors had a large influence on implementation of each project.

Project Location



1.1 Project Summary and JBIC Portion

1.1.1 Three Projects in Metro Manila

The three projects in the Metro Manila region were designed to improve traffic capacity to meet booming transport demand in Metro Manila (approximately 636 km^2), alleviate traffic congestion in the metropolitan area, make traffic safer, smoother, and more pleasant. The projects rehabilitated existing roads and constructed new roads needed for the above which contributes to economic development. A summary of each project is provided below.

1) Metro Manila Radial Road No.10 and Related Roads Project

This project was designed to construct, repair, and widen the R-10 (Radial Road No.10) and related roads, C-2 (Circumferential Road No.2), C-3 (Circumferential Road No.3), and C-4 (Circumferential Road No.4), mainly in Navotas, Caloocan City, and Manila City.

The ODA loan covered all foreign currency portion for civil works and consulting services. The detailed design of this project was provided through an E/S loan (7th ODA Loan).

2) Metro Manila Circumferential Road No.3 Construction Project

This project was designed to rehabilitate existing parts and construct new ones in the northern segment of C-3 centering on Caloocan City and Quezon City, as well as the improvement and construction of the Makati-Mandaluyong Road as a substitute road for the southern segment of C-3.

The ODA loan covered all of the foreign currency portion related to civil works and all of the consulting services. The detailed design of this project was provided through an E/S loan (7th ODA Loan).

3) Metro Manila Circumferential Road No.5 and Radial Road No.4 Construction Project

This project was designed to rehabilitate and construct the C-5 (Circumferential Road No.5) as a substitute road for C-4 centering on Quezon City, Pasig City, Makati City, and Parañaque, and the construction of the R-4 (Radial Road No.4) as a connecting road to the C-4 and C-5.

The ODA loan covered all foreign currency portion related to civil works and consulting services, as well as part of local currency costs.

1.1.2 Four Projects in the Rural Regions

The four projects in the rural regions were designed to repair regional transportation on Luzon Island, Leyte Island, and Panay Island as well as transportation from the rural areas to the Metropolitan Manila. The projects rehabilitated and constructed national highways that contribute to industrial and agricultural development.

1) Philippine-Japan Friendship Highway Rehabilitation Project

The Philippine-Japan Friendship Highway, as their name indicates, was constructed as an economic cooperation consisting mainly of provision of construction material, machinery and equipment by Japan to the Philippines. This highway is one of major arteries that runs North-South from Luzon Island to Mindanao Island (whole line entered service in 1979).

This project was aimed to secure smooth and safe transportation on the major artery that links Manila with the rural areas by repairing damage in pavement and shoulders between Laoag to Sta. Rita and between Calamba to Calauag (about 15 years have passed since construction in both sections) among Philippine-Japan Friendship Highway and related roads.

The ODA loan covers all foreign currency portion related to civil works and consulting services, as well as part of local currency costs.

2) West and North-West Leyte Road Improvement Project (I) & (II)

These two projects covered road rehabilitation and bridge construction along the West Leyte Road from Palo in the north of Leyte Island running south of the West Cost up to Sogod, and the North-West Leyte Road traveling through the north-west part of Leyte Island.

The ODA loan for the West and North-West Leyte Road Improvement Project (I) covers all foreign currency costs related to civil works and consulting services, while the ODA loan for the West and North-West Leyte Road Improvement Project (II) covers all foreign currency portion related to the civil work and consulting services as well as part of local currency costs. The detailed design of the West Leyte Road was provided through an E/S loan (7th ODA Loan), and the detailed design for the North-West Leyte Road was implemented in Phase (I) of this project.

3) Regional Tourism Development Roads Project

This project was designed to rehabilitate and construct regional arterial roads on Luzon Island and Panay Island.

The ODA loan covers all foreign currency portion related to construction work and consulting services, as well as part of local currency costs.

1.2 Background

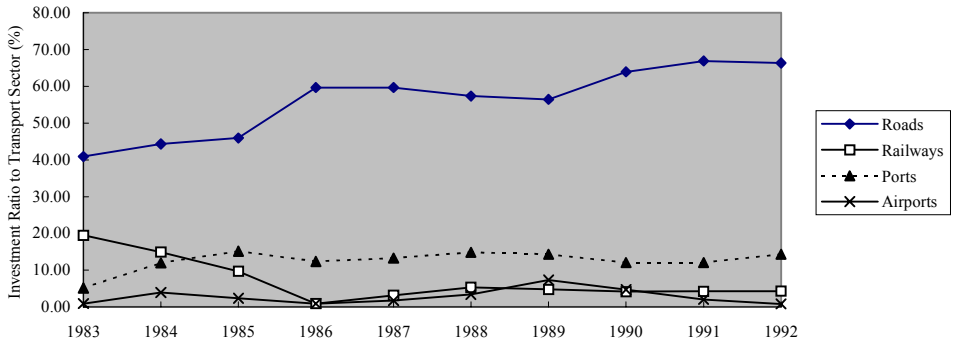
1.2.1 Positioning of Transport Sector in National Development Plans

In the Philippines' 1978-1982 Medium-Term National Development Plan, the development of the transport sector was considered to be the most important task along with the enhancement of the energy sector. This was also reflected in the budget: Approximately 22.6% (21,729 million pesos) of the infrastructure investments under this plan were allocated for the transport sector. In the following 1984-1987 Medium-Term National Development Plan and the 1987-1992 Medium-Term National Development Plan, the transport sector represented approximately 26% and 25%, respectively, of total infrastructure investments, positioning them at the top of development priorities.

1.2.2 Positioning of Road Sector

At the time of the appraisal, the Philippines' transport sector accounted for approximately 80% of all passenger transport and 60% of all freight transport. This was due to the fact that there was little demand for inter-island transport, and also to the fact that there was an insufficient number of ports and airports for inter-island transport. Compared with maritime or air transport, roads offered a greater degree of conveniency and represented the major means of transport within islands.

Therefore it became an urgent task in national development planning to develop the road sector, particularly alleviating road congestion in Metropolitan Manila, and contribution to the economic development of the rural area. This was also clearly observed in the fact that the road sector, which accounted for approximately 40% of total transport sector investments in 1983, has steadily grown in share.



Source: Medium Term (Five-Year) Philippine Development Plan

Figure 1 Investment Shares to Transport Sector Based on National Development Plan

1.2.3 Road Conditions in Metropolitan Manila

In 1980, Metro Manila, as the metropolitan area of the Philippines, was inhabited by approximately 6 million people[1], or approximately 12% of the nation's population in a 636 km^2 area, and the production in this area accounted for approximately 32% of the nation's total output, with an average income per household of 10,000 pesos/month (about double the national average).

The Urban Transport Study in Metro Manila Area (UTSMMA) was done by OCTA (present JICA) in 1973 as the first comprehensive transport plan for Metro Manila. In this study, a basic urban transport plan was recommended, consisting of the following three points: ① an arterial road network plan consisting of 6 circumferential and 10 radial roads, ② an urban high-speed mass transport plan consisting of construction of 5 express railways and the improvement of the Philippine National Railway (PNR), and ③ an urban express way network plan. On the other hand, upon completion of the Metro Manila Transport, Land Use, and Development Plan (MMETRO PLAN) with the World Bank loan in 1977, circumferential/radial roads, and light rail trains (LRT), among others, were recommended.

[1] The population in Metro Manila rose to 9.45 million by September 1995.

Urban traffic in Metro Manila, at that time, consisted almost entirely of buses, jeepneys[2], passenger cars, and taxis. The jeepney, which was the most popular public transportation, represented approximately 55% of the total volume (person-kilo base), followed by buses (16%). The railroad accounted for a very small share of public transportation, less than 0.2%. On the other hand, passenger cars were the principal private means of transport (approximately 16%)[3]. However, traffic jam had become an increasingly severe problem in the road network, and the construction of the road network recommended by UTSMMA and MMETROPLAN were prime tasks to be done.

1.2.4 Road Conditions in the Rural Regions

Government of the Philippine had been pushing forward with the expansion and up-grading of roads being aware of the importance of development of arterial roads, which will form the foundation of the nation's economic and social activities. As a result, the Philippines extended its national road network to 21,665 km in 1975, and to 23,798 km in 1982. However, a look at road network density by region showed great regional variations. For example, compared to Metro Manila's 4.62 km/km^2, Region II (Cagayan Valley) has 0.36 km/km^2, Region IV (South Tagalog) has 0.40 km/km^2, and Region VIII (East Visayas) has 0.43 km/km^2. Moreover, the quality of national roads in rural regions could not be said to be sufficient, and landslides, slope disruption, falling stones and other road hazards used to occur due to typhoons and heavy rain, causing traffic disruptions and poor transport efficiency.

2 Omnibus taxis with fixed routes (with approximate passenger capacity of 10 to 20)
3 According to Manila Metropolitan Traffic Volume Survey (JUMSUT. 1984: JICA)

1.3 History

1.3.1 Three Projects in Metro Manila

Year	Month	Metro Manila Radial Road No.10 and Related Roads Project	Metro Manila Circumferential Road No.3 Construction Project	Metro Manila Circumferential Road No.5 and Radial Road No.4 Construction Project
1973	9	OTCA (present JICA) recommended basic urban transport plan in UTSMMA		
1974		F/S by JICA: Radial Road No.10 (R-10) was implemented.		
1975	9	Completion of F/S above		
1977			F/S by JICA: "Metro Manila Roads Project C-3, C-4 Roads Construction Project" was implemented	
	7	MMETRO Plan: Metro Manila Transport, Land Use & Development Plan was implemented by UK Freeman Fox Inc. with the Philippine Government budget (World Bank funding): recommendation on construction of 10 circumferential and radial roads, division of roles of buses and jeepneys, and introduction of light rail trains (LRT) etc.		
1978	3		F/S by JICA: Completion of "Metro Manila Roads Project C-3, C-4 Roads Construction project"	
		Government of the Philippines has divided R-10 into 2 phases: Implementation of E/S for Phase 1 with World Bank loan (because of local currency budget allocation)		
	11	Provision of E/S budget for "C-3/R-10 Roads Construction Project", Phase 2 of R-10: In the implementation stage, E/S for Makati-Mandaluyong road included, service completion in September 1982 (for 7th ODA Loan).		
1982	5	Government of the Philippines requested construction of R-10 Phase 2 as a project covered by the 11th ODA Loan		
	9	Government Mission visited the Philippines		
	10	Appraisal Mission visited the Philippine		
1983	5	Pledge of 11th Loan		
	7	Signing of E/N		
	8		As a project under the 12th ODA Loan, Government of the Philippines requested construction of No. 10 and No. 11 sections of Circumferential Road No. 3, and construction of overpasses at Roosevelt. South and East Kamias and Ortigas intersections along Circumferential No.4 Road.	
	9	Signing of L/A (11th ODA Loan)		
	11		Government of the Philippines requested to redirect the entire 12th ODA Loan to a commodity loan due to the economic crisis (US$230 million).	
	12		Government of the Philippines changed their request for a commodity loan under the 12th ODA Loan (US$150 million).	

1.3.2 Three Projects in Metro Manila (continued)

Year	Month	Metro Manila Radial Road No.10 and Related Roads Project	Metro Manila Circumferential Road No.3 Construction Project	Metro Manila Circumferential Road No.5 and Radial Road No.4 Construction Project
1984	2		Government of the Philippines requested three project loan as candidate for the 12th ODA Loan. But this project involves a heavy local currency budget burden and did not fall within the allowable scope for 12th ODA loan.	
	3	JICA prepared Metro Manila Urban Transport Study. Results of Persontrip Survey made under "Metro Manila Urban Traffic Improvement Project" (L/A in June 1980, ¥5,410 million) were utilized.		
	5		Signing of 12th ODA Loan Agreement	
1985	2		Request for 13th ODA Loan: This project was requested to have its contents changed to sections 8, 9, 10, and 11 of Circumferential Road No. 3.	
	5		Government of the Philippines made an additional request for the 13th ODA Loan.	
	6		The Japanese Government Mission and JBIC Appraisal Mission visited the Philippines.	
	7	Metro Manila Urban Transportation Strategy Planning Project Part B2 was prepared by Renardet Inc., Italy with World Bank's fund. Part A is a master plan of whole Metro Manila transport sector, Part B for F/S of traffic control etc., and Part B2 for F/S of roads network improvement.		
	10		The Japanese Government pledged the 13th ODA Loan (this project is included in the project loan).	
	12		Signing of E/N	
1986	5		Signing of L/A (13th ODA Loan)	
	10			Government of the Philippines requested "Metro Manila Circumferential Road No.5 and Radial Road No.4 Construction Project" as a candidate project for the 14th ODA Loan.
1987	5			JBIC Appraisal Mission
	12			Signing of E/N
1988	1			Signing of L/A (14th ODA Loan)
1993	11	Completion of project		
1995	1		Completion of project	
1996	12			Completion of project

1.3.3 Four Projects in the Rural Regions (1)

Year	Month	Philippine-Japan Friendship Highway Rehabilitation Project
1966	11	Government of the Philippines requested financial support to Japan for the Philippine-Japan Friendship Highway Rehabilitation Project.
1967	11	JBIC dispatched a survey team for section between Apari and Davao.
1969	2	Signing of E/N for "Philippine-Japan Friendship Highway Project" (Loan amount ¥10.8 billion, covering 1,400 km. The remainder had been already constructed)
1976	3	Signing of L/A for "Philippine-Japan Friendship Highway and its Related Roads Project (I)" (Improvement project for existing segments and attached roads)
1978	1	Signing of L/A "Philippine-Japan Friendship Highway Improvement (II) (E/S)"
1979		Full line of Philippine-Japan Friendship Highway opened to traffic.
1981	4	Signing of L/A for "Philippine-Japan Friendship Highway and its Related Roads Project (II) (Laoag ~ Allacapan: Improvement of 210 km)
1983	5	5/83~6/84 ; F/S by JICA; "Study of Road Disaster Prevention Plan (Stage I) (Slope)" (Luzon Island, Samar Island, Leyte Island, Kennon Road, Delton Pass, Mahaplang ~ Sogod)
1984	1	1/84~10/85 ; F/S implementation through World Bank "Pavement and Axle Load Study" (Establishment of standards for axle load of vehicles for all road sections)
	10	10/84~3/85 ; F/S by JICA; "Study for Road Disaster Prevention Plan (Stage II) (Slope)" (Nauguikian Road, Lucena ~ Calauag, Allen Calbayog)
1986	5	Signing of L/A "Philippine-Japan Friendship Highway Improvement Project (II)-2
	6	6/86~7/87 ; F/S by JICA: "Study for Roads Improvement Plan (Pavement)" (Sta. Rita ~ Aritao, Calamba ~ Calauag, Allacapan ~ Aritao)
	10	①Government of the Philippines requested one portion of this project under the 14th ODA Loan (E/S for road improvement of Allacapan ~ Aritao sections, Laoag ~ Allacapan Road Improvement Project, Ripata Ferry Terminal improvement)
1987	3	Japanese Government Mission visited the Philippines.
	5	14th ODA loan appraisal mission to the Philippines
		②While the appraisal mission was in the Philippines, Government of the Philippines requested an additional loan for construction of Allacapan ~ Aritao section.
	7	③Government of the Philippines requested an additional loan for improvement of Aritao ~ Sta. Rita section and Calamba ~ Calauag section as part of the three rehabilitation loan projects.
	12	Pledge of rehabilitation loans covering above three requests (①, ②, and ③).
1988	4	Signing of E/N
	5	Signing of L/A for "Philippine-Japan Friendship Highway Rehabilitation Project" (14th Special Loan; Rehabilitation Loan)
1997	5	Completion of project

1.3.4 Four Projects in the Rural Regions (2)

Year	Month	West and North-West Leyte Road Improvement Project (I)	West and North-West Leyte Road Improvement Project (II)	Regional Tourism Development Roads Project
1978	1	F/S by MPWH "West Leyte Road Improvement Project" was completed		
	9	Pledged total of ¥30 billion for 7th ODA Loan including E/S loan (¥177 million) for the above project		
	11	Signing of E/N, L/A for "West and North-West Leyte Road Improvement Project (E/S)" (the 7th ODA Loan Project)		
1979	12		F/S for "Noth-West Leyte Road Improvement Project" by MPWH was completed	
1980	6	Signing of consultant contract concerning West Leyte Road Improvement (~3/82)		
1982	5	Request "West Leyte Road Improvement Project" Phase 1 (package 1 -5,8,9) and North-West Leyte Road Improvement Project (E/S) as part of 11th ODA Loan (Foreign currency amount of US$22.4 million)		
	9	Government mission visited the Philippines		
	10	Appraisal mission visited the Philippines		
1983	5	Pledge of the 11th ODA Loan		
	7	Signing of E/N		
	9	Signing of L/A		
1988	7		Government of the Philippines requested to the Japanese Government this project (West Leyte Road Construction Phase 2 and North-West Leyte Road Construction) as part of 15th ODA Loan.	Government of the Philippines requested to the Japanese Government this project under the 15th ODA Loan.
	8			DPWH completed F/S for "Regional Tourism Development Roads Project"
	10		Government mission visited the Philippines (18, 19/10)	
			JBIC appraisal mission visited the Philippines (17/10~25/10)	
	12		Signing of E/N	
1989	5		Signing of L/A for "West and North-West Leyte Road Improvement Project (II)" (the 15th ODA Loan)	Signing of L/A "Regional Tourism Development Roads Project" (the 15th ODA Loan)
1991	8	Completion of project		
1994	4			Completion of project
1996	11		Completion of project	

1.4 Comparison of Original Plan and Actual

1.4.1 Project Scope

1) Three Projects in Metro Manila

(1) Metro Manila Radial Road No.10 and Related Roads Project

	Plan	Actual	Difference
① R-10 Road			
Package II			
L=	3,200 m	3,006 m	-194 m
W=	60 m	60 m	0 m
Number of lanes	4 lanes	4 lanes	0 lane
Number of bridges	3	3	none
Sub-total length of constructed roads	3,200 m	3,006 m	-194 m
Package III			
L=	1,000 m	1,000 m	0 m
L=	600 m	0 m	-600 m
W=	30 m	20 m	-10 m
Number of lanes	3 lanes	3 lanes	0 lane
Number of bridges	2	2	none
Sub-total length of constructed roads	1,600 m	1,000 m	-600 m
Package IV			
IV-A L=	1,900 m	400 m	-1,500 m
W=	50 m	50 m	0 m
Number of lanes	6 lanes	6 lanes	0 lane
IV-B L=	900 m	400 m	-500 m
W=	40 m	40 m	0 m
Number of lanes	6 lanes	6 lanes	0 lane
Sub-total length of constructed roads	2,800 m	800 m	-2,000 m
Package V			
L=	1,200 m	1,200 m	0 m
W=	40 m	40 m	0 m
Number of lanes	8 lanes	8 lanes	0 lane
Number of elevated bridges (R-10, c-1)	1	1	none
Number of bridges (Del Pan Brdg.)	1	1	none
Sub-total length of constructed roads	1,200 m	1,200 m	0 m
Total length of constructed roads	**8,800 m**	**6,006 m**	**-2,794 m**
② Consulting Service			
Foreign	224 M/M	278 M/M	54 M/M
Local	144 M/M	730 M/M	586 M/M
Total of services	**368 M/M**	**1,008 M/M**	**640 M/M**

(2) Metro Manila Circumferential Road No.3 Construction Project

	Plan	Actual	Difference
① C-3 Road			
Segment 8			
L=	2,800 m	2,800 m	0 m
W=	32 / 40 m	32 / 40 m	0 m
Number of lanes	6 lanes	6 lanes	0 lane
Segment 9			
L=	1,870 m	1,870 m	0 m
W=	32 / 40 m	32 / 40 m	0 m
Number of lanes	6 lanes	6 lanes	0 lane
Segment 10			
L=	1,276 m	1,276 m	0 m
W=	32 / 40 m	32 / 40 m	0 m
Number of lanes	6 lanes	6 lanes	0 lane
Segment 11			
L=	1,128 m	1,128 m	0 m
W=	32 / 40 m	32 / 40 m	0 m
Number of lanes	6 lanes	6 lanes	0 lane
Sub-total length of constructed roads	7,074 m	7,074 m	0 m
② Makati-Mandaluyong Road			
Segment 2			
L=	1,335 m	1,036 m	-299 m
W=	24 m	0 m	-24 m
Number of lanes	4 lanes	4 lanes	0 lane
Segment 3			
L=	1,365 m	959 m	-406 m
W=	24 m	0 m	-24 m
Number of lanes	4 lanes	4 lanes	0 lane
Sub-total length of constructed roads	2,700 m	1,995 m	-705 m
Total length of constructed roads	**9,774 m**	**9,069 m**	**-705 m**
③ Consulting Service			
Before the start of construction			
Foreign	9 M/M	9 M/M	0 M/M
Local	22 M/M	22 M/M	0 M/M
Construction management			
Foreign	54 M/M	44 M/M	-10 M/M
Local	184 M/M	225 M/M	41 M/M
Total of services	269 M/M	300 M/M	31 M/M

(3) Metro Manila Circumferential Road No.5 and Radial Road No.4 Construction Project

	Plan	Actual	Difference
① C-5 Road			
Quezon City			
L=	2,420 m	1,241 m	-1,179 m
W=	40 m	40 m	0 m
Number of lanes	6 lanes	6 lanes	0 lane
Elevated bridge	0 m	1,019 m	1,019 m
Pasig River area			
L=	800 m	1,230 m	430 m
W=	40 m	40 m	0 m
Number of lanes	6 lanes	6 lanes	0 lane
Length of bridge	290 m	268 m	-22 m
C-5 (R-1 ～ R-4)			
L=	12,900 m	7,220 m	-5,680 m
W=	40 m	40 m	0 m
Number of lanes	4 lanes	6 lanes	2 lanes
Interchange	1	1	0
Sub-total length of constructed roads	**16,120 m**	**9,691 m**	**-6,429 m**
② R-4 Road			
R-4 (C-4 ～ C-5)			
L=	2,270 m	2,270 m	0 m
W=	30 m	30 m	0 m
Number of lanes	4 lanes	4 lanes	0 lane
Sub-total length of constructed roads	2,270 m	2,270 m	0 m
Total length of constructed roads	**18,390 m**	**11,961 m**	**-6,429 m**
③ Consulting Service			
Foreign	504 M/M	223 M/M	-281 M/M
Local	382 M/M	2,024 M/M	1,642 M/M
Total of services	**886 M/M**	**2,247 M/M**	**1,361 M/M**

(4) Philippine-Japan Friendship Highway Rehabilitation Project (No. 1)

	Plan	Actual	Difference
① Laoag - Allacapan			
1. Pavement works			
Concrete paving (2 lanes)	71.0 km	74.9 km	3.9 km
Asphalt overlay (2 lanes)	10.4 km	16.1 km	5.7 km
2. Bridge construction works			
Rebuilding of bridges	14 bridges	13 bridges	-1 bridge
Total length of bridges	656 m	667 m	11 m
3. Improvement section of drain ditch	4.7 km	3.3 km	-1.4 km
4. Slope protection	8 bridges	5 bridges	-3 bridges
② Allacapan - Aritao			
1. Pavement works section			
Reconstruction of concrete pavement (2 lanes)	90.0 km (Concrete pavement)	40.0 km (Asphalt pavement)	-50.0 km
Reconstruction of concrete pavement (1 lane)	58.0 km (Concrete pavement)	3.0 km (Asphalt pavement)	-55.0 km
Asphalt overlay (2 lanes)	104.0 km	8.0 km	-96.0 km
2. Bridge construction works			
Rebuilding of bridges	10 bridges	2 bridges	-8 bridges
Rehabilitation of rivers	0 loc.	11 loc.	11 loc.
3. Improvement of drain ditch	One Set	One Set	No difference
4. Consulting service			
Foreign	118 M/M	208 M/M	90 M/M
Local	1,504 M/M	1,653 M/M	149 M/M

Philippine-Japan Friendship Highway Rehabilitation Project (No. 2)

	Plan	Actual	Difference
③ Aritao - Sta. Rita			
1. Pavement works			
Reconstruction of concrete paving (2 lanes)	46.0 km	50.7 km	4.7 km
Reconstruction of concrete paving (1 lane)	114.0 km	34.3 km	-79.7 km
Asphalt overlay (2 lanes)	34.5 km	136.7 km	102.2 km
2. Bridge construction works			
Rebuilding of bridges	10 bridges	27 bridges	17 bridges
3. Improvement of drain ditch	113 km	75 km	-38 km
4. Slope protection	13 bridges	116 bridges	103 bridges
5. Consulting service (including section between Calamba and Calauag)			
Foreign	202 M/M	288 M/M	86 M/M
Local	1,869 M/M	2,819 M/M	950 M/M
④ Calamba - Calauag			
1. Pavement works			
Reconstruction of concrete pavement	55.3 km	65.7 km	10.4 km
Reconstruction of concrete pavement	21.1 km	0.0 km	-21.1 km
Asphalt overlay	5.0 km	115.2 km	110.2 km
2. Bridge construction works			
Rebuilding of bridges	14 bridges	10 bridges	-4 bridges
3. Improvement of drain ditch	One set	One set	No difference
4. Slope protection	One set	One set	No difference
⑤ Repair of Ripata Ferry Terminal			
Rehabilitation of north quay	75 m	75 m	0 m
Rehabilitation of No.2 quay	95 m	95 m	0 m
Pavement of terminal site	One set	One set	No difference
Repair of terminal building	One set	One set	No difference

(5) West and North-West Leyte Road Improvement Project (I)

	Plan	Actual	Difference
① West Leyte Road Improvement (I)			
1. Pavement works	(concrete pavement)		
Package 1	12.5 km	10.4 km	-2.1 km
Package 2	8.9 km	9.3 km	0.4 km
Package 3	6.3 km	6.5 km	0.2 km
Package 4	7.8 km	8.0 km	0.2 km
Package 5	13.4 km	13.7 km	0.3 km
Package 8	18.3 km	18.6 km	0.3 km
Package 9	15.2 km	15.5 km	0.3 km
Total length of constructed roads	82.4 km	82.0 km	-0.4 km
2. Rebuilding of bridges			
Package 1	10 bridges	8 bridges	-2 bridges
Package 2	8 bridges	5 bridges	-3 bridges
Package 3	6 bridges	6 bridges	0 bridge
Package 4	11 bridges	8 bridges	-3 bridges
Package 5	15 bridges	14 bridges	-1 bridge
Package 8	9 bridges	6 bridges	-3 bridges
Package 9	13 bridges	11 bridges	-2 bridges
Total number of bridges	72 bridges	58 bridges	-14 bridges
3. Consulting service			
Foreign	284 M/M	107 M/M	-177 M/M
Local	312 M/M	1,191 M/M	879 M/M
Total of services	596 M/M	1,298 M/M	702 M/M
② North-West Leyte Road Improvement Project (I)			
1. Consulting service			
Foreign	352 M/M	467 M/M	115 M/M
Local	596 M/M	892 M/M	296 M/M
Total of services	948 M/M	1,359 M/M	411 M/M

(6) West and North-West Leyte Road Improvement Project (II)

	Plan	Actual	Difference
① West Leyte Road Improvement (II)			
1. Pavement works	(concrete pavement)		
Package 6	12.0 km	11.9 km	-0.1 km
Package 7	14.2 km	14.2 km	0.0 km
Package 10	17.5 km	0.0 km	-17.5 km *
Package 11	9.3 km	9.1 km	-0.2 km
Package 12	5.5 km	5.5 km	0.0 km
Package 13	23.3 km	0.0 km	-23.3 km *
Sub-total length of constructed sections	81.8 km	40.7 km	-41.1 km
2. Rebuilding of bridges			
Package 6	4 bridges	4 bridges	0 bridge
Package 7	0 bridge	0 bridge	0 bridge
Package 10	12 bridges	0 bridge	-12 bridges*
Package 11	11 bridges	8 bridges	-3 bridges
Package 12	4 bridges	4 bridges	0 bridge
Package 13	5 bridges	0 bridge	-5 bridges*
Total number of bridges	36.0 bridges	16.0 bridges	-20.0 bridges
5. Consulting service			
Foreign	121 M/M	571 M/M	450 M/M
Local	1,008 M/M	2,019 M/M	1,011 M/M
Total of services	1,129 M/M	2,590 M/M	1,461 M/M
② North-West Leyte Road Improvement (II)			
1. Pavement works	(concrete pavement)		
Segment 1	13.7 km	13.8 km	0.1 km
Segment 2	17.7 km	17.4 km	-0.3 km
Segment 3	18.2 km	14.7 km	-3.5 km
Segment 4	10.7 km	0.0 km	-10.7 km *
Segment 5	9.7 km	0.0 km	-9.7 km *
Segment 6	12.5 km	0.0 km	-12.5 km *
Segment 7	8.6 km	8.0 km	-0.6 km
Segment 8	14.0 km	14.0 km	0.0 km
Segment 9	10.4 km	10.4 km	0.0 km
Sub-total length of constructed sections	115.5 km	78.3 km	-37.2 km
2. Rebuilding of bridges	32 bridges	13 bridges	-19 bridges
3. Slope protection	One Set	One Set	No difference
4. Consulting service			
Foreign	121 M/M	165 M/M	44 M/M
Local	1,077 M/M	809 M/M	-268 M/M
Total of services	1,198 M/M	974 M/M	-224 M/M
③ Total of construction work sections	197.3 km	119.0 km	-78.3 km
④ Total of consulting services	2524 M/M	3683 M/M	1159 M/M

Note) Construction sections indicated by * are being implemented by PH-P147.

(7) Regional Tourism Development Roads Project

	Plan	Actual	Difference
① Luzon Island			
1. Carmona - Ternate Section			
Asphalt overlay	49.0 km	0.0 km	-49.0 km
Concrete pavement	0.0 km	49.0 km	49.0 km
2. Ternate ~ Nasugbu and related sections			
Asphalt pavement	58.0 km	8.0 km	-50.0 km
Sub-total length of constructed sections	107.0 km	57.0 km	-50.0 km
② Panay Island			
1. Nabas - Catikulan Section			
Asphalt pavement	21.5 km	20.2 km	-1.3 km
Sub-total length of constructed sections	21.5 km	20.2 km	-1.3 km
Total length of constructed sections	128.5 km	77.2 km	-51.3 km
③ Consulting service			
Foreign	302.0 M/M	87.0 M/M	-215.0 M/M
Local	80.0 M/M	290.0 M/M	210.0 M/M
Total of services	382.0 M/M	377.0 M/M	-5.0 M/M

1.4.2 Implementation Schedule

(1) Metro Manila Radial Road No.10 and Related Roads Project

	Plan			Actual			Difference (month)		
	Start	Completion	Period	Start	Completion	Period	Time of start	Time of completion	Period
Signing of L/A		September 1983			September 1983			0	
Package II	April 1984	September 1986	30	November 1986	November 1993	85	31	86	55
Package III	October 1984	March 1986	18	July 1985	August 1992	86	9	77	68
Package IV	October 1984	March 1986	18	January 1989	October 1991 *Contract cancelled	34	51	67	16
Package V	April 1984	September 1986	30	November 1985	April 1990	54	19	43	24
NBRI (Additional construction work)	-	-	-	August 1990	June 1993	35	-	-	-
Consulting service	April 1984	September 1986	30	September 1983	November 1993	123	-7	86	93
Whole project (Start ~ Completion of work)	April 1984	September 1986	30	July 1985	November 1993	101	15	86	71

NBRI: Navotas River Bridge Improvement

(2) Metro Manila Circumferential Road No. 3 Construction Project

	Plan			Actual			Difference (month)		
	Start	Completion	Period	Start	Completion	Period	Time of start	Time of completion	Period
Signing of L/A		November 1985			May 1986			6	
C-3 Road									
Segment 8	January 1988	December 1989	24	June 1988	December 1992	55	5	36	31
Segment 9	January 1988	December 1989	24	June 1988	December 1992	55	5	36	31
Segment 10	January 1988	December 1989	24	June 1988	January 1995	80	5	61	56
Segment 11	January 1988	December 1989	24	June 1988	January 1995	80	5	61	56
Makati-Mandaluyong Road									
Segment 2	April 1988	June 1989	15	June 1988	June 1991	37	2	24	22
Segment 3	April 1988	June 1989	15	June 1988	May 1992	48	2	35	33
C-3 Road/Makati-Mandaluyong Road									
Consulting service	April 1986	December 1989	45	July 1987	April 1995	94	15	64	49
Whole project (Start~completion of work)	January 1988	December 1989	24	June 1988	January 1995	80	5	61	56

(3) Metro Manila Radial Road No. 5 and Circumferential Road No. 4 Construction Project

	Plan			Actual			Difference (month)		
	Start	Completion	Period	Start	Completion	Period	Time of start	Time of completion	Period
Signing of L/A		September 1987			January 1988			4	
Quezon City									
A-1-1	January 1990	June 1991	18	April 1991	June 1995	51	15	48	33
Flyover	-	-	-	March 1995	December 1996	22	-	-	-
Pasig River	January 1990	June 1991	18	February 1991	August 1996	67	13	62	49
C-5(R-1 ~ R-4)	August 1990	November 1992	28	July 1992	June 1995	36	23	31	8
R-4(C-4 ~ C-5)	January 1990	June 1991	18	December 1990	August 1996	69	11	62	51
Consulting service	July 1988	December 1992	54	June 1989	August 1996	87	11	44	33
Whole Project (Start ~ completion of work)	January 1990	November 1992	35	December 1990	December 1996	73	11	49	38

(4) Philippine-Japan Friendship Highway Rehabilitation Project

	Plan			Actual			Difference (month)		
	Start	Completion	Period	Start	Completion	Period	Time of start	Time of completion	Period
Signing of L/A (Rehabilitation special loan)		May 1988			May 1988			0	
REGION III									
Laoag ~ Allacapan	June 1989	September 1991	28	June 1991	June 1995	49	24	45	21
Allacapan ~ Aritao	January 1990	September 1992	33	November 1991	December 1995	50	22	39	17
Aritao ~ Sta. Rita	July 1990	February 1993	32	June 1991	May 1997	72	11	51	40
REGION IV									
Calamba ~ Clauag	July 1990	February 1993	32	June 1991	May 1997	72	11	51	40
REGION X									
Ripata Ferry Terminal	February 1989	June 1990	17	May 1991	August 1992	16	27	26	-1
Consulting service	December 1988	February 1993	51	January 1990	May 1997	89	13	51	38
Whole project (Start ~ completion of work)	February 1989	February 1993	49	May 1991	May 1997	73	27	51	24

(5) West and North-West Leyte Road Improvement Project (I), (II)

	Plan			Actual			Difference (month)		
	Start	Completion	Period	Start	Completion	Period	Time of start	Time of completion	Period
Signing of L/A (I) (II)		March 1983 December 1988			September 1983 May 1989			6 5	
Phase I West Leyte	September 1983	June 1985	22	June 1985	August 1991	75	21	74	53
Phase II West, North-West Leyte	July 1990	June 1992	24	August 1991	November 1996	64	13	53	40
Consulting service	March 1983	June 1992 -	112	December 1983	November 1996	156	9	53	44
Whole project (Start ~ completion of work)	September 1983	June 1992	106	June 1985	November 1996	138	21	53	32

(6) Regional Tourism Development Roads Project

	Plan			Actual			Difference (month)		
	Start	Completion	Period	Start	Completion	Period	Time of start	Time of completion	Period
Signing of L/A		May 1989			May 1989			0	
Carmona ~ Ternate	July 1990	June 1992	24	February 1992	August 1993	19	19	14	-5
Ternate ~ Nasugbu	July 1990	June 1992	24	February 1992	December 1992	11	19	6	-13
Nabas ~ Caticlan	July 1990	June 1992	24	October 1991	April 1994	31	15	22	7
Consulting service	December 1989	June 1992 -	31	January 1991	August 1993	32	13	14	1
Whole project (Start ~ completion of work)	July 1990	June 1992	24	October 1991	April 1994	31	15	22	7

1.4.3 Project Cost

(1) Metro Manila Radial Road No. 10 and Related Roads Project

	Plan				Actual				Difference			
	Foreign currency (million yen)		Local currency (million peso)		Foreign currency (million yen)		Local currency (million peso)		Foreign currency (million yen)		Local currency (million peso)	
	Total amount	ODA loan portion	Total amount	ODA loan portion	Total amount	ODA loan portion	Total amount	ODA loan portion	Total amount	ODA loan portion	Total amount	ODA loan portion
Civil works	4,523.00	4,523.00	172.70	0.00	1,507.00	1,507.00	149.17	0.00	-3,016.00	-3,016.00	-23.53	0.00
Consulting service	377.00	377.00	7.81	0.00	623.00	623.00	6.00	0.00	246.00	246.00	-1.81	0.00
Land acquisition	-	-	67.29	0.00	-	-	256.63	0.00	-	-	189.34	0.00
Others	500.00	500.00	17.27	0.00	-	-	-	0.00	-500.00	-500.00	-17.27	0.00
Sub-total	5,400.00	5,400.00	265.07	0.00	2,130.00	2,130.00	411.80	0.00	-3,270.00	-3,270.00	146.73	0.00
Loan amount (million yen)	5,400.00				2,130.00				-3,270.00			
Total (million yen)	13,352.10				4,872.59				-8,479.51			

Exchange rate

At the time of plan: 1.00 peso = ¥30.00

Actual 1.00 peso = ¥6.66

(2) Metro Manila Circumferential Road No. 3 Construction Project

	Plan				Actual				Difference			
	Foreign currency (million yen)		Local currency (million peso)		Foreign currency (million yen)		Local currency (million peso)		Foreign currency (million yen)		Local currency (million peso)	
	Total amount	ODA loan portion	Total amount	ODA loan portion	Total amount	ODA loan portion	Total amount	ODA loan portion	Total amount	ODA loan portion	Total amount	ODA loan portion
Civil works	1,173.00	1,173.00	81.61	0.00	798.66	798.66	150.47	0.00	-374.34	-374.34	68.86	0.00
Consulting service	207.00	207.00	4.32	0.00	165.59	165.59	8.84	0.00	-41.41	-41.41	4.52	0.00
Land acquisition	-	-	60.74	-	-	-	40.61	-	-	-	-20.13	0.00
Others	59.00	59.00	4.08	0.00	-	-	-	-	-59.00	-59.00	-4.08	0.00
Sub-total	1,439.00	1,439.00	150.75	0.00	964.25	964.25	199.92	0.00	-474.75	-474.75	49.17	0.00
Loan amount (million yen)	1,439.00				964.25				-474.75			
Total (million yen)	3,549.50				1,993.84				-1,555.66			

Exchange rate

At the time of plan: 1.00 peso = ¥14.00

Actual 1.00 peso = ¥5.15

(3) Metro Manila Circumferential Road No. 5 and Radial Road No. 4 Construction Project

	Plan				Actual				Difference			
	Foreign currency (million yen)		Local currency (million peso)		Foreign currency (million yen)		Local currency (million peso)		Foreign currency (million yen)		Local currency (million peso)	
	Total amount	ODA loan portion	Total amount	ODA loan portion	Total amount	ODA loan portion	Total amount	ODA loan portion	Total amount	ODA loan portion	Total amount	ODA loan portion
Civil works	2,377.00	2,377.00	208.02	N.A.	2,184.61	2,184.61	1,281.37	384.07	-192.39	-192.39	1,073.35	N.A.
Consulting service	425.00	425.00	4.35	N.A.	622.25	622.25	103.34	0.00	197.25	197.25	98.99	N.A.
Land acquisition	-	-	138.50	-	-	-	unknown	-	-	-	unknown	N.A.
Others	280.00	280.00	72.69	N.A.	-	-	-	-	-280.00	-280.00	-72.69	N.A.
Sub-total	3,082.00	3,082.00	423.56	250.71	2,806.86	2,806.86	1,384.71	384.07	-275.14	-275.14	961.15	133.36
Loan amount (million yen)	4,836.97				4,446.84				-390.13			
Total (million yen)	6,046.92				8,719.57				2,672.65			

Exchange rate

At the time of plan: 1.00 peso = ¥7.00

Actual 1.00 peso = ¥4.27

(4) Philippine-Japan Friendship Highway Rehabilitation Project

	Plan				Actual				Difference			
	Foreign currency (million yen)		Local currency (million peso)		Foreign currency (million yen)		Local currency (million peso)		Foreign currency (million yen)		Local currency (million peso)	
	Total amount	ODA loan portion	Total amount	ODA loan portion	Total amount	ODA loan portion	Total amount	ODA loan portion	Total amount	ODA loan portion	Total amount	ODA loan portion
Civil works	8,185.00	8,185.00	744.00	N.A.	8,005.22	8,005.22	2,424.70	975.94	-179.78	-179.78	1,680.70	N.A.
Consulting service	1,154.00	1,154.00	106.00	N.A.	1,749.30	1,749.30	234.88	5.22	595.30	595.30	128.88	N.A.
Price escalation	0.00	0.00	159.00	N.A.	-	-	-	-	-	-	-159.00	N.A.
Others	463.00	463.00	51.00	N.A.	-	-	281.96	-	-463.00	-463.00	230.96	N.A.
Sub-total	9,802.00	9,802.00	1,060.00	600.00	9,754.52	9,754.52	2,941.54	981.16	-47.48	-47.48	1,881.54	381.16
Loan amount (million yen)	14,003.00				13,944.06				-58.94			
Total (million yen)	17,222.00				22,314.90				5,092.90			

Exchange rate

At the time of plan: 1.00 peso = ¥7.00

Actual 1.00 peso = ¥4.27

(5) West and North-West Leyte Road Improvement Project (I)

	Plan				Actual				Difference			
	Foreign currency (million yen)		Local currency (million peso)		Foreign currency (million yen)		Local currency (million peso)		Foreign currency (million yen)		Local currency (million peso)	
	Total amount	ODA loan portion	Total amount	ODA loan portion	Total amount	ODA loan portion	Total amount	ODA loan portion	Total amount	ODA loan portion	Total amount	ODA loan portion
West Leyte												
Civil works	5,053.00	5,053.00	159.16	0.00	2,075.96	2,075.96	202.63	0.00	-2,977.04	-2,977.04	43.47	0.00
Consulting service	329.00	329.00	8.35	0.00	671.35	671.35	23.93	0.00	342.35	342.35	15.58	0.00
North-West Leyte												
Consulting service	354.00	354.00	8.83	0.00	196.51	196.51	13.12	0.00	-157.49	-157.49	4.29	0.00
Others	564.00	564.00	17.63	0.00	-	-	-	0.00	-564.00	-564.00	-17.63	0.00
Sub-total	6,300.00	6,300.00	193.97	0.00	2,943.82	2,943.82	239.68	0.00	-3,356.18	-3,356.18	45.71	0.00
Loan amount (million yen)	6,300.00				2,943.82				-3,356.18			
Total (million yen)	12,119.10				4,669.52				-7,449.58			

Exchange rate

At the time of plan: 1.00 peso = ¥30.00

Actual 1.00 peso = ¥7.20

(6) West and North-West Leyte Road Improvement Project (II)

	Plan				Actual				Difference			
	Foreign currency (million yen)		Local currency (million peso)		Foreign currency (million yen)		Local currency (million peso)		Foreign currency (million yen)		Local currency (million peso)	
	Total amount	ODA loan portion	Total amount	ODA loan portion	Total amount	ODA loan portion	Total amount	ODA loan portion	Total amount	ODA loan portion	Total amount	ODA loan portion
Civil works	3,198.00	3,198.00	378.00	N.A.	2,996.60	2,996.60	483.51	N.A.	-201.40	-201.40	105.51	N.A.
Consulting service	332.00	332.00	33.00	N.A.	477.04	477.04	50.00	N.A.	145.04	145.04	17.00	N.A.
Land acquisition	-	-	121.00	-	-	-	56.00	-	-	-	-65.00	N.A.
Price escalation	-	-	83.00	N.A.	-	-	-	-	-	-	-83.00	N.A.
Others	320.00	320.00	57.00	N.A.	-	-	-	-	-320.00	-320.00	-57.00	N.A.
Sub-total	3,850.00	3,850.00	672.00	262.00	3,473.64	3,473.64	589.51	370.53	-376.36	-376.36	-82.49	108.53
Loan amount (million yen)	5,500.60				5,041.00				-459.60			
Total (million yen)	8,083.60				5,967.27				-2,116.33			

Exchange rate

At the time of plan: 1.00 peso = ¥6.30

Actual 1.00 peso = ¥4.23

(7) Regional Tourism Development Roads Project

	Plan				Actual				Difference			
	Foreign currency (million yen)		Local currency (million peso)		Foreign currency (million yen)		Local currency (million peso)		Foreign currency (million yen)		Local currency (million peso)	
	Total amount	ODA loan portion	Total amount	ODA loan portion	Total amount	ODA loan portion	Total amount	ODA loan portion	Total amount	ODA loan portion	Total amount	ODA loan portion
Civil works	1,169.00	1,169.00	131.00	N.A.	1,197.75	1,197.75	353.84	N.A.	28.75	28.75	222.84	N.A.
Consulting service	232.00	232.00	7.00	N.A.	282.08	282.08	16.52	N.A.	50.08	50.08	9.52	N.A.
Land acquisition	-	-	10.00	-	-	-	29.10	-	-	-	19.10	N.A.
Price escalation	-	-	24.00	N.A.	-	-	-	-	-	-	-24.00	N.A.
Others	117.00	117.00	16.00	N.A.	-	-	-	-	-117.00	-117.00	-16.00	N.A.
Sub-total	1,518.00	1,518.00	188.00	103.33	1,479.83	1,479.83	399.46	139.31	-38.17	-38.17	211.46	35.98
Loan amount (million yen)	2,169.00				2,130.39				-38.61			
Total (million yen)	2,700.00				3,345.31				645.31			

Exchange rate

At the time of plan: 1.00 peso = ¥6.30

Actual 1.00 peso = ¥4.67

2. Analysis and Evaluation

2.1 Evaluation of Project Implementation

2.1.1 Project Scope

1) Three Projects in Metro Manila

(1) Metro Manila Radial Road No. 10 and Related Roads Project

This project was designed to construct part of Radial Road No. 10 (hereunder radial road will be referred to as [R-#]), and Circumferential Road No. 2, No. 3, and No. 4 (hereunder circumferential road will be referred to as [C-#], and is a continuation of the R-10 construction (Phase 1) implemented with World Bank funding. Hereunder, the project scope, in other words, Packages II and V corresponding to R-10, Package III corresponding to C-2, and Package IV-B corresponding to C-3, and Package IV-A corresponding to C-4 will be evaluated.

Under the original project scope total length of construction was 8.8km, but only 6.0km were actually completed. Some parts of the roads were left unconstructed under Package III and Packages IV-A and IV-B. The reason for this was that the required land could not be acquired (problems of land acquisition and of transfer of illegal occupants). Moreover, regarding the construction of bridges, the construction of 7 bridges was originally planned, and they were completed largely as planned.

(2) Circumferential Road No. 3 Construction Project

Under the scope of this project Segments 8, 9, 10, 11 of the C-3 road and Segments 2 and 3 of the Makati-Mandaluyong Road were covered.

Compared to the 9.8km that were originally planned, only 9.1km were actually completed. The segments that were deleted from this project was part of the Makati-Mandaluyong Road (segments 2 and 3), but this section was completed as a separate project directly undertaken by the DPWH and Mandaluyong City Government. The main reason of this deletion in the project scope was the fact that some contractors did not have enough equipment/machinery and workers at the sites, so that progress of the project was drastically delayed. In regard to such project implementation schedule delays, the DPWH issued warnings to contractor repeatedly. However, no visible improvements in the construction arrangement and the implementation schedule were made, so that the DPWH canceled the contracts with this contractor and instead pursued these constructions under its own management. The DPWH aimed to recover the implementation delays and rapidly assure traffic safety for roads abandoned by contractors while they were still being excavated. The Manila South Engineering District of DPWH and Mandaluyong City were actually in charge of these projects, and largely completed their projects according to the original plan.

Other changes that were made included increasing the road elevation for C-3 (segments 8 to 11) from the originally planned elevation, and changing the shape of the box culverts at locations where a road meets a channel in order to increase the allowable velocity. These changes made it possible to deal with overhead flooding of roads, a frequently occurring problem, revisioning the Detailed Design (implemented for the E/S loan approximately 10 years prior (1978) to the commencement of the project). This revision of the Detailed Design made it possible to reflect in the design the latest data on

precipitation, drainage basins, and river flows, resulting in the above-described changes.

(3) Metro Manila Circumferential Road No. 5 and Radial Road No. 4 Construction Project

This project had its scope defined as Quezon City side of C-5, Pasig side of C-5, R-1 to R-4 of C-5, and C-4 to C-5 of R-4.

Compared to the 18.4km in the original project scope, only 12.0km were actually completed. The following describes the differences that occurred in the project scope for each section.

(i) Quezon City Side of C-5

At the Quezon City side of C-5, compared to the originally planned 2.4km, 2.3km (including the extension of viaduct) were actually completed. The reason for this change was that all the required land could not be acquired in two locations. In one of these locations, the construction of ordinal road was replaced by building one flyover and two additional bridges at nearby areas (total length of 1.0km) (Contract Package A-1-1). In another locations, no solution was found for the inability to acquire required land, and thus a construction of 1.2km road (Contract Package A-1-2) was removed from the project scope. The road alignment that was deleted from the project scope (drafted by the DPWH) became the point to be observed at the appraisal conducted by the JBIC. The points that were indicated at the appraisal at that time were the following.

① *The planned alignment is cranked, reducing the driving speed. Moreover, prospects are bad.*
② *The gradient of the road is between 5% and 6%, and there are many problems with regard to (road) tolerance and traffic safety (the gradient is more steeper in the case of alignment which cuts off Blue Ridge Village).*
③ *Due to the connections to service roads to existing communities, the arrangement of crossings is complex and the crossings are on slopes.*

At the time of the appraisal, it was decided that the solutions of those problems should be found in the review of this project's Detailed Design to restudy lines while taking into consideration the degree of difficulty of acquiring land. However, land acquisition proved to be more difficult than expected, and as a result, Package A-1-2 had to be removed from the project scope. (The construction of the Blue Ridge Village part of C-5, which was one of the biggest problems at the time of the appraisal, was included in the Metro Manila Interchange Construction Project (IV) under the 22nd ODA Loan, and the construction of a route that possibly minimizes land acquisitions was planned.)

(ii) C-5 Pasig Side

On the Pasig side of C-5 (Contract Package A-2), compared to the originally planned 0.8km, 1.2km were actually completed. The reasons behind this increment was changes in the location of bridges and amendments in alignments of the R-1 to R-4 segments of C-5 (Contract Package B6). As a result of these changes, the amount of seawall construction for Pasig River was reduced, but the length of the bridge was increased by two spans.

Moreover, regarding the pavement structure, the initially planned PCC (portland cement concrete) pavement[4] was changed to AC (asphalt concrete) pavement[5]. The reasons for these changes were the fact that the President of the Philippines required the commencement of partial opening in 1994, but demand for concrete rose sharply due to increase of construction projects throughout the nation, exceeding the production capacity of the batch plants, affecting the supply of cement to this project. Additionally, as a measure to recover delays in the project implementation, it was also judged that asphalt pavement, which has a shorter curing period than concrete pavement, would be advantageous.

(iii) Section between R-1 and R-4 of C-5

Compared to the originally planned 12.9km for sections R-1 to R-4 of C-5, only 7.2km were actually completed. This is due to the fact that it became clear the ODA loan amount could not cover the initial scope of this project, and so the section from R-1 to the Manila South Super Expressway of C-5 was struck out. Thereafter, the Philippine Government decided to implement the construction of this section with BOT scheme, but the dearth of funds of the BOT entity itself prevented the start of construction (as of March 1998).

(iv) Section between C-4 and C-5 of R-4

For sections from C-4 of R-4 to C-5 (Contract Package A-3), the originally planned 2.3km were mostly completed. However, for the same reason as the Pasig side of C-5, the pavement type was changed from PCC to AC.

[4] Surface course 260mm, Base course 250mm, Subbase 100mm
[5] Surface course 125mm, Base course 300mm, Subbase 400mm

2) Four Projects in the Province

(1) Philippine-Japan Friendship Highway Rehabilitation Project

This project integrates three projects related to Philippine-Japan Friendship Roads that were initially requested by the Philippine Government for the 14th ODA Loan, under the form of special rehabilitation loans[6]. The following table shows the total road sections which were covered by this project. But this project was only responsible to implement rehabilitation work for the necessary segments within the above total sections.

Table 1 Segments Covered by Philippine-Japan Friendship Highway Rehabilitation Project

Region	Sections Covered	Total Extension of Sections (km)
Region III	Laoag ~ Allacapan	219.4
	Allacapan ~ Aritao	338.4
	Aritao ~ Sta. Rita	200.2
Region IV	Calamba ~ Calauag	180.9
Total		938.9

Source: Appraisal materials

(i) Laoag and Allacapan Section

Compared to the initially planned 10.4km of asphalt pavement overlay, 16.1km were actually completed. The reason for this was that the initial plan had been prepared based on a design completed in 1978 (Philippine-Japan Friendship Road Improvement Project (II) E/S Loan), but in the approximately 10 years that followed, the pavement deterioration grew worse. Other changes than the ones noted above consist of the addition of shore protection work (additional construction cost of approximately 21 million pesos) .

(ii) Allacapan and Aritao Section

Both the improvement of the concrete pavement and the asphalt pavement overlay were actually shorter by approximately 50 to 96 km compared to the original project scope.

The reason of this discrepancy was that the earthquake in Dig Dig (commonly referred to as the Baguio Earthquake) that occurred in July 1990, caused damages that required additional treatments. The Dig Dig earthquake occurred after the completion of the Detailed Design implemented in this project, so that a renewed design was prepared for the disaster area. As a result, it became clear that the section between Aritao and Sta.Rita was most seriously damaged among other sections covered by this project, and required disaster measures. Moreover this section, due to its proximity to Metro Manila, has heavy traffic, and thus it was decided to give rehabilitation in this section precedence over other area covered by the project. On the other hand, overall construction costs also increased due to the increase in the volume of construction work due to required disaster measures, and the section

6 Refer to the paragraph of “History” in detail.

from Allacapan to Aritao, which was set a lower priority, was deleted from project scope of this project.

(iii) Aritao and Sta. Rita Section

Improvement of the concrete pavement for two-lane roads was completed only for 34.3km, compared to the originally planned 114.0km. On the contrary, asphalt pavement overlay was completed for 136.7km, compared to the originally planned 34.5km. One of the reason for this is the areas which had not been considered for rehabilitation under the original project scope underwent damage through the above-mentioned earthquake and as a result were included in the scope of the project. Moreover there was a high possibility that uneven settlement would occur at the places where faults, landslides or waves of the ground appeared by the earthquake, so that asphalt pavement, with its soft structure, was determined to be more appropriate than concrete pavement, with its rigid structure, to prevent cracking.

(iv) Calamba and Calauag Section

Asphalt pavement overlay was completed for 115.2km compared to the originally planned 5.0km. The reason for this is that the actual condition of the pavement at the time of Detailed Design was worse than prospected in the original plan which was prepared based on the F/S by JICA (Philippine-Japan Friendship Roads and Road Improvement Plan Survey, July 1987), which made it necessary to extend length of overlay construction.

(2) West and North-West Leyte Road Improvement Projects(I), (II)

West and North-West Leyte Road Improvement Project consisted of two consecutive phases. The sections covered by each phase are listed in the table below. Concrete pavement construction was implemented only for those sections where improvement was deemed necessary.

Table 2 Sections Covered by West and North-West Leyte Road Improvement Projects (I), (II)

Project Name	Sections covered	Total length of sections (km)
West and North-West Leyte Road Improvement Project (I)	Jaro ~ Baybay	143.8
	Maasin ~ Malitbog	36.2
	Sub-total	180.0
West and North-West Leyte Road Improvement Project (II)	Bato ~ Maasin	8
	Malitbog ~ Sogod	29.0
	Bato ~ Bontoc	24.1
	Lemon ~ Naval	51.1
	Isabel ~ Abliao	34.6
	Abliao ~ Kananga	33.2
	Sub-Total	207.9
Total		387.9

Source: Appraisal materials

The discrepancy between the originally planned sections for which improvement was deemed necessary and the sections where improvements were actually implemented are described as follows.

Table 3 Extension of Construction Work of West and North-West Leyte Road Improvement Project (I) and (II) (Plan/Actual)

(Units: km, bridge)

	Length of constructed section			
	Plan	Actual	Difference	Change ratio against plan (%)
Improvement and construction of concrete pavement				
West and North-West Leyte Road Improvement (I)	82.4	82.0	-0.4	-0.5
West and North-West Leyte Road Improvement (II)	197.3	119.0	-78.3	-39.7
Total	279.7	201.0	-78.7	-28.1
Rebuilding of bridge				
West and North-West Leyte Road Improvement (I)	72	58	-14	-19.4
West and North-West Leyte Road Improvement (II)	68	29	-39	-57.4
Total	140	87	-53	-37.9

Source: PCR and appraisal materials

(i) West and North-West Leyte Road Improvement Project (I)

This project involved Detailed Design, the improvement of sections where rehabilitation was a higher priority (Packages 1 to 5, 8, and 9) in the West Leyte Road, the revision of the F/S (prepared by the DPWH) followed by Detail Design for the North-West Leyte Road.

(ii) West and North-West Leyte Road Improvement Project (II)

Under this project, as a continuation of the previously described Phase (I), the amelioration of the unimproved section of the West Leyte Road (Packages 6, 7, 10-13) and the construction of the North-West Leyte Road.

Compared to the originally planned 81.8km for the West Leyte Road, 40.7km were actually completed. The reason for this was the increase in project costs for recovery from damages by typhoon that occurred during implementation, which resulted in a local currency shortage and caused the implementation of Packages 10 and 13 to be delayed. Moreover, compared to the originally planned 115.5km for the North-West Leyte Road, 78.3km were actually completed. Like for the West Leyte Road, there was a shortage of local currency funds, so that the implementations of segments 4, 5, and 6 were delayed.

The previously mentioned 2 packages and 3 segments whose implementation had been postponed were implemented under the “Arterial Road Link Development Project (I)” funded as part of the 19th ODA Loan to the Philippines.

(3) Regional Tourism Development Roads Project

This project covered roads in two different locations, the south-western part of Luzon Island (Cavite

Province and Batangas Province) and the north-western part of Panay Island (Akuran Province).

(i) Southwest segment of Luzon Island

Compared to the originally planned 107.0km, 57.0km were actually completed in southwest Luzon Island. The difference of 50km with the originally planned figure corresponds to the section from Ternate to Nasugbu and related sections. These sections would cross the virgin forests and mangroves. Thus, according to the Philippine law, an Environmental Compliance Certificate (E.C.C.) issued by the Department of Environment and Natural Resources (DENR) should have been obtained prior to the commencement of construction. But DPWH failed to obtain this certificate and also ran short of funds. As the result, these sections were not implemented under this project. The shortage of local currency budget will be described in the section on project costs.

The amendments in project contents included changing from the originally planned asphalt pavement to concrete pavement for the Carmona to Ternate section. The reason for this change was that it became necessary to reinforce the pavement in order to withstand the heavy truck and trailer traffic, which was increasing in this section. The original plan was designed based on the F/S prepared by the DPWH in 1988, but, already at the time of the appraisal, a future revision of pavement structure plan was scheduled at the stage of review of Detailed Design (which was incorporated in the scope of this project), because a growing number of factories moved into the neighborhood of the project site owing to the economic development in Metro Manila. This change in the scope of the project at the implementation stage, was valid technologically and is not considered to be a problem in particular.

(ii) Northwest segment of Panay Island

This construction section in northwest Panay Island was largely completed as planned, and no particular problems have been reported (compared to the initially planned 21.5km, 20.2km were actually completed).

3) Overall Evaluation of Seven Projects

Regarding the extension of pavements, calculation of actual achievement ratio against original plans yield figures ranging from 60.1% to 92.8%, as shown in the table below. Two projects, the Circumferential Road No. 3 Construction Project and the Philippine-Japan Friendship Highway Rehabilitation Project were completed largely according to plan. However, the implementation of the remaining 5 projects fell short of the original plan. An examination of all the projects as a whole shows that, compared to the originally planned 1,054.6km, only 849.9km were completed.

Naturally, figures of length of the constructed roads show that, compared to new constructions of urban roads in Metro Manila, length of road improvement in the rural areas are longer, where inter-province transportation is aimed for.

Table 4　Achievement Ratio of Project Scope

Project Name	Plan (km)	Actual (km)	Achievement ratio (%)
Metro Manila Radial Road No. 10 and Related Roads Project	8.8	6.0	68.2
Circumferential Road No. 3 Construction Project	9.8	9.1	92.9
Metro Manila Circumferential Road No. 5 and Radial Road No. 4 Construction Project	18.4	12.0	65.2
Philippine-Japan Friendship Highway Rehabilitation Project	609.4	544.6	89.4
West and North-West Leyte Road Improvement Project (I), (II)	279.7	201.0	71.9
Regional Tourism Development Roads Project	128.5	77.2	60.1
Total	1,054.6	849.9	80.6

Source: PCR and appraisal materials

The factors and evaluations regarding differences in project scope between original plans and actual accomplishments are stated below.

① Land acquisition

The project that was most affected by land acquisition problems was the "Metro Manila Radial Road No. 10 and Related Roads Project", where a part of the project scope was struck out. However, one aspect that must be paid attention to is the fact that the other two projects in Metro Manila[7] also suffered difficulties regarding the acquisition of land. In fact, all projects experienced delays in implementation schedule and project cost escalation due to land acquisition problems, which also turned into a factor for amendments in the project scope. The ideal method to prevent the adverse effects of land acquisition difficulties on projects is to complete the acquisition of land prior to the commencement of each project. Unfortunately, in reality, this can hardly achieved. A possible alternative might be to establish effective displacement and resettlement programs for the resident. Currently, the establishment of such programs at the time of appraisals is one of the criteria for approving ODA loans.

② Shift into BOT-type Projects

In case of "Metro Manila Circumferential Road No. 5 and Radial Road No. 4 Construction Project", one part of the scope was converted into a BOT-type project (see section on project costs) because, for a time, the implementation of the entire project scope with ODA loans appeared extremely difficult. However, by the time of this post-evaluation, the implementation of the segment in question had not started.

[7] “Circumferential Road No. 3 Construction Project” and “Metro Manila Circumferential Road No. 5 and Radial Road No. 4 Construction Project”

The choice of the BOT scheme could be reasonable and proper in terms of finding supplementary funds the government was short of, but on the other hand, by transferring the ownership of the project from the governmental executing agency to the BOT contractor, the influence of the government on project promotion can be reduced and this can have a negative effect. In other words, if the profitability of the roads planned by a BOT-type project is low, or if a deterioration of the financial position of BOT constructors occurs, that BOT project may become stalled for a long period until the problem is resolved. In the future, full consideration should be given to the fact that delays in the implementation of this kind of projects with a strong public character cause social losses, and the implementation of BOT-type projects should be carefully studied.

③ Failure to Obtain Environmental Compliance Certificate (E.C.C.)

The obtainment of the Environmental Compliance Certificate for the Regional Tourism Development Roads Project was delayed. Similarly to land acquisition, it would be desirable for the obtainment of the E.C.C. to be finalized prior to the commencement of the project, as a condition for project implementation. (Currently, the Government of the Philippines is, as its policy, listing up only projects that have already obtained their E.C.C. with regard to requesting JBIC funding for new projects. Moreover, for those projects exceptionally requested with high expectation to obtain their E.C.C. in the near future, JBIC is conducting careful studies regarding the possibility of obtaining the E.C.C., treating this as one of the criteria for project appraisal while checking observance of JBIC's Environmental Guidelines.)

④ Natural Disasters

In the Philippine-Japan Friendship Highway Rehabilitation Project, the occurrence of an earthquake made it necessary to redraft the Detailed Design and add repair works. Moreover, in the West and North-West Leyte Roads Improvement Project (II), the typhoon damage incurred during project implementation caused a cost run-up in order to perform repairs, so that the project scope of the initial plan had to be reduced. These occurrences are considered to have been unpredictable and unavoidable.

2.1.2 Implementation Schedule

1) Three Projects in Metro Manila

(1) Metro Manila Radial Road No. 10 and Related Roads Project

Compared to the originally planned completion date of September 1986, the project was actually completed in November 1993 with a total delay of 86 months. The major cause of this delay was the package II (the section related to the R-10 and C-4 roads) suffered an 86-month delay in implementation. The major reasons for the delay in the Package II were that land acquisition was more difficult than anticipated (delay of approximately 53 months), and the fact that design changes had to be made because the armor rocks required for the seawall for the reclaimed section facing Manila Bay turned out to be difficult to procure, so that it was decided to use concrete bulkheads instead (delay of approximately 11 months).

Other packages also experienced delays in implementation due to difficulties in acquiring the required

land. For instance, bidding and contract procedures for Package IV-A were implemented twice (in April 1988 and November 1990). The first contract was cancelled on the contractor's wish due to difficulties in acquiring the required land for the project (at point when 0.9% of the project scope had been implemented). The second bidding procedure for the same section was implemented after adjusting the contents of construction and prices, but again difficulties arose in acquiring the needed land, so that the contract was cancelled without the issue of Notice to Proceed (October 1991). Moreover, in Package IV-B too, the contract was canceled due to land acquisition problems.

The overall delay for all projects caused by difficulties in acquiring needed land that was approved by the DPWH to contractors amounted to 2,898 days (approximately 97 months).

(2) Metro Manila Circumferential Road No. 3 Construction Project

Compared to the originally planned completion date of December 1989, the project was actually completed in January 1995, or 61 months behind schedule. The reason for this delay was that segments 10 and 11 (together forming section C-3) were completed 61 months late. This delay was caused by delays in bidding procedure and difficulties in acquiring land. Bidding procedure was repeated three times, in December 1987, June 1988, and May 1990, and approximately 31 months were required from the first tender until the start of construction[8]. Moreover, because of unsuccessful acquisition of the needed land, the possible construction amount as of February 1992 was limited to only about 44% of the total amount of contract.

In addition to the above, rebidding was conducted for the Makati-Mandaluyong Segment. In this case, the originally hired contractors were unable to throw in enough equipment and machinery to the construction site, so that even after 11 months, only 10% of the total contracted amount had been implemented, based on which the DPWH cancelled the contracts.

(3) Metro Manila Circumferential Road No. 5 and Radial Road No. 4 Construction Project

Compared to the originally estimated completion date of November 1992, the project was actually completed in December 1996, with 49 months delay. The reason for this delay lies on the fact that the construction of 1 fly-over and 2 bridges were added in Quezon City. These additional construction (representing a 1,019-meter section extension) were completed after 22 months from March 1995. As mentioned in the section on the Project Scope, these additional construction were the implemented as a solution to land acquisition problems, so that the underlying cause of delay resided in land acquisition.

Aside from the above mentioned overall delay, there were also some small delays in the implementation schedule in some sections, caused by delays in land acquisition, delays due to the transplant of water conduits and power cables/service lines, as well as the fact that the contractors were unable to throw in enough equipment and machinery to the construction site, etc.

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[8] For the first bidding (December 1987), the awarded price exceeded the estimated cost, causing negotiations with all bidders to fall apart.
The evaluation of the second bidding (June 1988) showed a possibility that it might conflict with the Guidelines for Procurement under ODA Loans, and it took approximately 10 months to verify this. The bidder signed contracts (October 1989) based on the condition that unit prices would be adjusted, but thereafter, the DPWH did not adjust unit prices and cancelled the contract, making a third bidding procedure necessary (May 1990).

2) Four Projects in the Rural Regions

(1) Philippine-Japan Friendship Highway Rehabilitation Project

Compared to the originally planned completion date of February 1993, the project was actually completed in May 1997 with a delay of 51 months. The reason for this delay was that damage from a major earthquake, whose epicenter was the Dig Dig Fault, was suffered in July 1990, so that the Detailed Design for the Aritao-Sta. Rita section, which was under construction at the time, had to be revised, and as a result, certain time was required for incremental constructions that were added to the project scope.

Under the initial plan, the 5 packages for the Aritao-Sta. Rita section were to be implemented concurrently, but in the process of revising the Detailed Design for this section, the DPWH took into consideration the amount of incremental construction and the implementation schedule, and to ensure effective implementation, divided the project for this section into 8 packages. Since these 8 packages were sequentially designed and implemented by order of priority by renovation, there were packages for which the project scope could not be confirmed promptly considering overall project cost, and in the end, the DPWH allowed the contractors a total construction extension of 99.5 months.

Even in the section between Calamba and Calauag, which was not directly affected by the earthquake, delays did occur in the implementation schedule. The main reason for this is that the construction of the section between Calamba and Calauag was started successively while confirming the additional required costs for the above-mentioned rehabilitation of Aritao-Sta. Rita section.

(2) West and North-West Leyte Road Improvement Project (I, II)

Compared to the originally estimated completion date of June 1992, the project was actually completed in November 1996 with a delay of 53 months. The reasons for this delay were the damage incurred due to a typhoon that occurred during the implementation of Phase (II) and the time required to recover the damage, plus the fact that procurement of aggregate for concrete became difficult during construction, and also that the Japanese contractor demanded cancellation of its contract, so that further time had to be spent selecting a new contractor. (According to the executing agency, the contractor claimed to cancel its contract because of interference with its construction work.)

(3) Regional Tourism Development Road Project

Compared to the originally estimated completion date of June 1992, the project was actually completed in April 1994 with a delay of 22 months. This overall delay was caused by a delay (15 months) in the commencement of construction and extension (7 months) of the construction work for the Nabas-Caticlan section. The delay in the commencement of construction was caused by delays in the bidding procedures held by the DPWH, and the delays in implementation schedule were due to delays in acquiring the needed land and the difficulty to procure the required construction materials.

3) Overall Evaluation of Seven Projects

The following table shows a comparison of the initially estimated and the actual implementation schedules. The ratio of the actual to the original implementation schedule ranges from approximately 209% to 337% for Metro Manila. On the other hand, for rural roads, it is approximately from 129% to 149%.

Table 5 Analysis of Implementation Schedule for Seven Projects (Plan/Actual)

	Project Name	Period (month)		B/A x 100
		Plan = A	Actual = B	(%)
Metro Manila	Metro Manila Radial Road No. 10 and Related Roads Project	30	101	336.7
	Circumferential Road No. 3 Construction Project	24	80	333.3
	Metro Manila Circumferential Road No. 5 and Radial Road No. 4 Construction Project	35	73	208.6
Rural Regions	Philippine-Japan Friendship Highway Rehabilitation Project	49	73	149.0
	West and North-West Leyte Road Improvement Project (I, II)	106	138	130.2
	Regional Tourism Development Roads Project	24	31	129.2

Source: PCR and appraisal materials

The factors and evaluation regarding differences in the originally estimated and actual implementation schedule are as below.

①Delays in land acquisition

The problem of land acquisition was the major cause of delays in implementation schedule for the 3 projects in Metro Manila and the Regional Tourism Development Roads Project. As mentioned in the section on Project Scope, it is believed that if land acquisition would have gone smoothly, the greatest part of delays could have been avoided.

②Delays in bidding procedure

Bidding procedure for the Metro Manila Circumferential Road No. 3 Construction Project was conducted three times, requiring a total of 31 months. The Regional and Tourism Development Road Project took 15 months of delays for single bidding procedure. Such delays were caused by various unavoidable factors such as unsuccessful tenders, but probably in some cases, crucial documents remained unprocessed for a long time within the executing agency (DPWH), and more rapid handling by the executing agency is considered to be necessary.

③ Implementation capabilities of contractors

In the Metro Manila Circumferential Road No. 3 Construction Project, some contractors did not throw in sufficient machinery, equipment, and workers to the construction sites, and the DPWH therefore canceled their contracts. Similarly, in the Metro Manila Circumferential Road No. 5 and Radial Road No. 4 Construction Project, some contractors did not throw in enough equipment and machinery to the

construction sites, causing delays in the implementation schedule. One strategy to prevent recurrence of such situations may be to set harder criteria for screening contractors. The criteria currently used in the Philippines for prequalification appraisals of road construction contractors normally require the contractors to have "experience in the execution of projects of at least 50% of the (estimated) amount of proposed contract", while a standard that is sometimes used in Japan is "experience in the execution of projects comparable or greater amount to/than the proposed contract". Thus setting a more severe prequalification standard in the Philippines than the one currently used would be highly recommended.

2.1.3 Project Cost

1) Three Projects in Metro Manila

(1) Metro Manila Radial Road No. 10 and Related Roads Project

With regard to the foreign currency portion, compared to the originally estimated ¥5,400 million, actual foreign currency expenditures were ¥3,270 million lower, at ¥2,130 million. This was mainly due to the fact that part of the project scope was deleted (curtailment of 2,749 m, or approximately 30%) and also due to fluctuations in the exchange rate (actual exchange rate (hereinafter “actual exchange rate” will refer to actual weighted average exchange rate) of 6.66 yen/peso, against estimated exchange rate of 30.00 yen/peso at the time of appraisal). However, the expenditure for consulting service increased due to an extension (of 93 months) in the supervision period, which was caused by delays in acquiring land and design changes corresponding to the on-site soil conditions.

Regarding the local currency portion, compared to the originally estimated 265.07 million pesos, actual local currency expenditures amounted to 411.80 million pesos, a 146.73 million pesos cost overrun. This cost overrun was due to the fact that land acquisition actually costed 256.63 million pesos, or roughly four times more compared to the originally estimated 67.29 million pesos.

(2) Circumferential Road No. 3 Construction project

Regarding the foreign currency portion, compared to the originally estimated ¥1,439.00 million, actual foreign currency expenditures were ¥474.75 million lower, at ¥964.25 million. This was mainly due to the fact that the project scope was reduced (705 m were constructed by the DPWH and Mandalyong City as a separate project), as well as fluctuations in the exchange rate (actual exchange rate of 5.15 yen/peso compared to approximated exchange rate of 14.00 yen/peso at the time of the appraisal).

Regarding the local currency portion, compared to the originally estimated 150.75 million pesos, the actual local currency expenditures was 199.92 million pesos, or 49.17 million more than estimated. This increase was due to the fact that the local currency cost of procuring construction equipment, facility and materials escalated sharply.

(3) Metro Manila Circumferential Road No. 5 and Radial Road No. 4 Construction Project

Regarding the foreign currency portion, compared to the originally estimated ¥3,082.00 million, actual foreign currency expenditures were ¥2,806.86, or ¥275.14 million lower. Although this project, as the others, experienced large foreign exchange fluctuations (actual exchange rate of 4.27 yen/peso, compared to approximated exchange rate of 7.00 yen/peso at the time of appraisal), the main reason

for the cost underrun was a reduction in the project scope (6,429m). However, the expenditures for consulting services increased for the same reasons as for the “Metro Manila Radial Road No. 10 and Related Roads Project”. Regarding local currency portion, compared to the originally estimated 432.56 million peso, actual local currency expenditures were 1,384.71 million pesos, or a 961.15 million peso cost overrun. This cost overrun was due to a sudden rise in the price of construction equipment and materials similarly to the case of “Circumferential Road No. 3 Construction Project”.

2) Four Projects in the Rural Area

(1) Philippine-Japan Friendship Highway Rehabilitation Project

Regarding foreign currency portion, compared to the originally estimated ¥9,802.00 million, actual foreign currency expenditures amounted to ¥9,754.00 million, almost as much as the approximated amount. This project, like the others, was subject to exchange rate fluctuations, with the actual exchange rate being 4.29 yen/peso compared to the 7.00 yen/peso estimated at the time of the appraisal. However, as mentioned previously, the Detailed Design had been revised to incorporate recovery of damages made necessary by a major earthquake during construction, causing modifications in the project scope and an increase in total project costs, which made it impossible to implement the entire project as initially planned. Under these circumstances, the initially estimated foreign currency portion was almost entirely used while giving priority for the rehabilitation of the earthquake damages.

Regarding the local currency portion, compared to the originally estimated 1,060.00 million pesos, actual local currency expenditure amounted to 2,941.54 million peso, or a 1,881.54 million peso cost overrun. This cost overrun was caused by expenditure of repairs for damages incurred from the earthquake.

(2) West and North-West Leyte Road Improvement Project (I)

Regarding foreign currency portion, compared to the originally estimated ¥6,300.00 million, the actual foreign currency expenditure of the project was ¥2,943.82 million, or ¥3,356.18 million less than estimated. This was due to a sharp depreciation of pesos against yen (actual exchange rate of 7.20 yen/peso, compared to approximated exchange rate of 30.00 yen/peso at the time of appraisal).

Regarding the local currency portion, compared to the originally estimated 193.97 million pesos, the actual local currency expenditures amounted to 239.68 million pesos, or 45.71 million pesos less than estimated. This was due to the fact that, similarly to the case of “Metro Manila Radial Road No. 10 and Related Roads Project”, the price of construction equipment and materials escalated sharply.

(3) West and North-West Leyte Road Improvement Project (II)

Regarding the foreign currency portion, compared to the originally estimated ¥3,850.00 million, the actual foreign currency expenditure was ¥3,473.64 million, or roughly the estimated amount. However, attention should be paid to the fact that 78.3km of road rehabilitation and construction of 39 bridges were struck out from the initially planned project scope. This is due to the shortage of foreign currency funds resulted from additional expenditures for recovering damage inflicted by a typhoon (according

to a report from the executing agency), and also from the price escalation of construction equipment and materials. The actual exchange rate was 4.23 yen/peso, compared to 6.30 yen/peso approximated at the time of the appraisal for this project.

Regarding the local currency portion, compared to the originally estimated 672.00 million pesos, the actual local currency expenditures amounted to 589.51 million pesos, or 82.49 million pesos less than estimated. This was mainly due to the fact that total project cost sharply increased due to repair costs for typhoon damage, so that the project scope was reduced.

(4) Regional Tourism Development Roads Project

Regarding foreign currency portion, compared to the originally estimated ¥1,518.00 million, the actual foreign currency expenditures of the project was ¥1,479.83 million, or almost the amount estimated. However, taking a look at the breakdown of the expenditures, it was observed that both factors for cost underrun (reduction of project scope by approximately 51km) and exchange rate fluctuations as well as a factor for cost overrun (sharp rise in the price of construction equipment and material) existed, so that, in the end, the foreign currency expenditures of the project were almost the expected amount. The actual exchange rate was 4.67 yen/pesos, compared to the approximated exchange rate of 6.30 yen/pesos at the time of appraisal.

Regarding the local currency portion, compared to the originally estimated 188.00 million pesos, the actual local currency expenditures were 399.46 million peso, or a 211.46 million peso cost overrun. This is due to the fact that, the price of construction equipment and materials shot up above the resulting cost reduction from reduction of project scope.

3) Overall Evaluation of Seven Projects

The factors lying behind the differences that emerged between the estimated cost and actual expenditures were mainly ① fluctuations in the exchange rate, ② rise in the price of construction equipment and materials, and ③ reduction in the project scope. Regarding ③, details have already been described above in the section of Project Scope, so that only an analysis and evaluation for ① and ② are provided below.

(i) Impact of exchange rate fluctuations

The exchange rate (yen/peso) at the time of the appraisal, at the start of construction, at the end of construction, and during construction are listed in the following table. The (weighted average) rate during construction for each project has been fallen by about 22-74% compared to the rate that was approximated at the time of appraisal. Particularly for the three projects for which the appraisals were conducted in 1983 and 1985 (① Metro Manila Radial Road No. 10 and Related Roads Project (1983), ② Metro Manila Circumferential Road No. 3 Construction Project (1985), and ③ West and North-West Leyte Road Improvement Project (I) (1983)), the yen/peso exchange rate during construction devaluated to approximately 20% to 37% of the rate at the time of appraisals (strong yen and weak peso), which is considered to have resulted in real terms in the increase of value of the ODA loan.

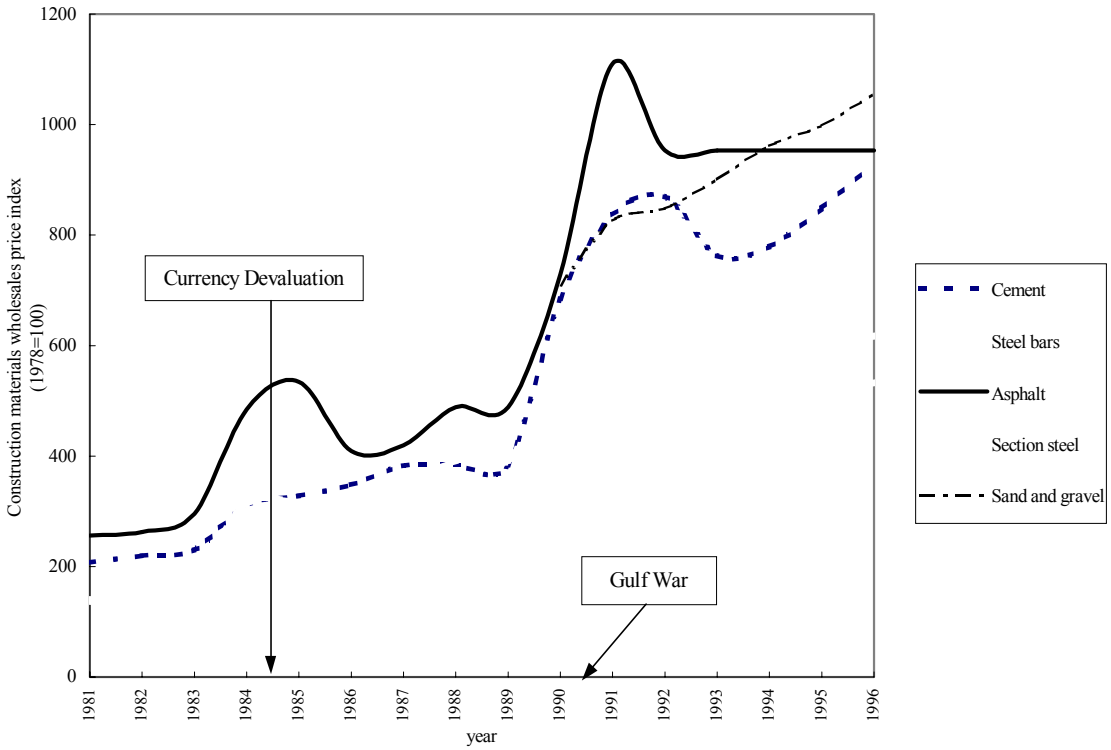
Table 6　Changes of Exchange Rate from Time of Appraisal to Completion of Project

Project Name	At the time of appraisal (Yen/Peso)	At the start of construction (Yen/Peso)	At the end of construction (Yen/Peso)	During construction (Yen/Peso)	During construction / At the time of appraisal x 100 (%)
Metro Manila Radial Road No. 10 and Related Roads Project	30.00	12.82	4.10	6.66	22.20
Metro Manila Circumferential Road No. 3 Construction Project	14.00	6.07	3.66	5.15	36.79
Metro Manila Circumferential Road No. 5 and Radial Road No. 4 Construction Project	7.00	5.96	4.15	4.27	61.00
Philippine-Japan Friendship Highway Rehabilitation Project	7.00	4.90	3.00	4.29	61.29
West and North-West Leyte Road Improvement Project (I)	30.00	12.82	4.15	7.20	24.00
West and North-West Leyte Road Improvement Project (II)	6.30	12.82	4.15	4.23	67.14
Regional Tourism Development Roads Project	6.30	4.96	3.87	4.67	74.13

Source: Prepared from IFS and appraisal materials

(ii) Inflation of price of construction materials

Regarding the price of construction materials, the wholesale price indices (1978=100) of the major construction materials, cement, steel bars, asphalt, section steel, sand, and sand gravel, show an increase during the period of currency devaluation between 1982-1986 and during the Gulf War in 1990. Considering the time of appraisal and the time of construction of each project together with trends in the following figure, the surge in construction material prices had a direct impact on the following three projects: ① Metro Manila Circumferential Road No.5 and Radial Road No. 4 Construction Project (appraisal: 1987, construction: 1990 to 1996), ② Philippine-Japan Friendship Highway Rehabilitation Project (appraisal: 1987, construction: 1991 to 1997), and ③ West and North-West Leyte Road Improvement Project (II) (appraisal: 1988, construction: 1991 to 1996).



Source: PCR and appraisal materials

Figure 2 Trends of Wholesale Price Index for Major Construction Materials

(iii) Factors behind Differences in Estimated and Actual Costs in Seven Projects

As evidenced in the following table, which summarizes the factors behind the differences in estimated and actual costs of each one of the seven projects, the cause of foreign currency cost underruns in five projects is considered to have been fluctuations in the exchange rate. However, for almost every project, reduction of the project scope was one of the causes for the cost underrun.

Table 7　Causes of Changes in Project Costs

Project Name		Factors for cost underrun	Factors for cost overrun	Notes
Metro Manila Radial Road No.10 and Related Roads Project	Foreign currency portion	Exchange rate fluctuation Reduction of project scope	—	
	Local currency portion	—	Land acquisition cost	
Circumferential Road No.3 Construction Project	Foreign currency portion	Exchange rate fluctuation Reduction of project scope	—	
	Local currency portion	—	Inflation in price of construction equipment and materials	
Metro Manila Circumferential Road No.5 and Radial Road No.4 Construction Project	Foreign currency portion	Exchange rate fluctuation Reduction of project scope	—	Conversion to BOT scheme Additional construction to solve land acquisition problems
	Local currency portion	—	Inflation in price of construction equipment and materials	
Philippine-Japan Friendship Highway Rehabilitation Project	Foreign currency portion	Reduction of project scope (Rate fluctuation)	—	Change in project scope due to repairs of earthquake damage
	Local currency portion	—	Addition of project scope	
West and North-West Leyte Road Improvement Project (I)	Foreign currency portion	Rate fluctuation	—	
	Local currency portion	—	Sharp rise in price of construction equipment and materials	
West and North-West Leyte Road Improvement Project (II)	Foreign currency portion	Mostly as estimated (Reduction of project scope) (Inflation in price of construction equipment and materials)		Recovery of typhoon damage caused shortage of funds, leading to reduction of project scope
	Local currency portion	Reduction of project scope	—	
Regional Tourism Development Roads Project	Foreign currency portion	Mostly as estimated Reduction of project scope (due to inflation in price of construction equipment and materials)		
	Local currency portion	—	Inflation in price of construction equipment and materials	

2.1.4 Implementation Scheme

1) Executing Agency

The executing agency for these 7 projects is the Department of Public Works and Highways (DPWH)[9]. The DPWH is responsible for the planning, design, construction, and maintenance of national highways, ports, and public buildings. The demarcation of the DPWH extends over the ① planning, design, construction, and maintenance of national highways, including bridges, and ② the design and construction of harbor facilities and public buildings.

The permanent organization of the DPWH consists of a Secretary (= Minister), with four Undersecretaries and four assistant Undersecretaries under him, as well as 11 services and bureaus. In addition, as local offices in the rural regions, there are 16 regional offices (RO), with 116 district engineering offices under them, staffed by 34,202 employees nationwide (including 19,309 regular employees, 3,955 of whom are engineers).

As the executing agencies for these projects, the Project-Management Office - Urban Road Project Office (PMO-URPO) was appointed as the organization in charge of managing the projects in Metro Manila, and the Project Management Office - Philippine Japan Highway Loan (PMO-PJHL) as the organization in charge of projects funded with ODA loans in the rural areas. The project managers for these projects were DPWH officers supervising one or several projects, permanently assigned at each PMO (Manila), who inspected construction sites as needed and provided guidance. Five or six regional officers were permanently stationed at construction sites for each project to perform monitoring tasks. These regional officers were staff contracted for each project, and their contracts would be renewed for the next project when their performance was deemed satisfactory.

At the DPWH, besides the above-mentioned PMOs and officers permanently assigned to construction sites, Quality Assurance Unit (QAU) is also assigned to control construction quality. QAU is staffed by Bureau of Design (BOD), Bureau of Construction (BOC), and Bureau of Maintenance (BOM) officers, who inspect construction sites on average once every 3 months and perform quality control.

One of the major responsibilities of DPWH is to secure the land for the construction sites. However, the land acquisition delays were the main cause of delays in implementation schedule, as mentioned previously in the section on the Implementation Schedule. In the case of the "Metro Manila Radial Road No. 10 Road and Related Roads Project", it was recognized at the time of the appraisal (1983) that 80% of the land required for Package III and Package IV had not been acquired yet. Although land for construction sites was not secured for all projects in this way, it had been proved that a presidential directive designed to accelerate land acquisition was effective for a different project under implementation at that time, so that it was thought that all land acquisitions could be completed in the 2-year period preceding construction start of our projects. However, as previously mentioned in the section on the Project Scope, the failure to complete land acquisition for Package IV caused delays in the implementation schedule and made it necessary to renew bidding for procurement of contractors, and eventually led to a deletion in the project scope.

As historical background for these 7 projects, it should be noted that it corresponded to the period of

[9] The Ministry of Public Works (MPWH) which is the predecessor of DPWH was the executing agency for projects implemented prior to 1987.

big change from the Marcos regime to the Aquino administration. From the end of the Marcos regime around 1985, opposition to land appropriations grew fierce among residents and squatters. Through the birth of the Aquino administration, an Anti Urban Poor Committee was established[10], something which could not have been foreseen at the time of the appraisal in 1983, and thereafter the approval of this committee was necessary to execute land acquisitions and displace and resettle resident and squatters, resulting in extension of the time required for land acquisition.

However, under this new system, old problems remained, namely ① assessed compensation amount were always lower than market prices and not reasonable, and ② insufficient measures were provided to secure resettlement areas for displaced squatters. As a result, smooth land acquisition was never achieved. Furthermore, the DPWH's insufficient budget for land acquisition was an additional factor behind delays.

As previously mentioned, the change in the procedures related to land acquisition could not have been anticipated by anybody, including JBIC, at the time of the appraisal. Currently, the establishment of valid displacement and resettlement plans for resident by the time of the appraisal is one of the approval criteria. Moreover, if judged necessary, the infrastructure development in the resettlement areas may also be included among the purposes of ODA loans.

2) Consultants

Regarding the three projects[11] E/Ss (Engineering Study) were conducted, the Consultants who performed the E/S on request from the DPWH were then asked to provide project support and contracted on a direct contract basis. For the four other projects for which no E/S was implemented, Consultants were hired through competitive bidding by using short lists.

As the main contents of consulting services, assistance on tender procedure, detailed design, and supervision on construction were performed. For every project the Consultants were joint ventures between Japanese and local companies (Japanese were the primes). During the implementation of the projects, both Japanese and local Consultants were stationed as permanent engineers at construction sites, and provided services to PMOs of the DPWH (regional officers stationed either in Manila or in regional offices). The Consultants' performance was judged satisfactory.

3) Contractors

For all projects, the Contractors were hired through International Competitive Bidding with prequalifications. A total of 63 contracts were concluded. Excluding the "West and North-West Leyte Road Improvement Project (I)", the Contractors of the other six projects were exclusively Philippine companies. Only in the case of the West and North-West Leyte Road Improvement Project (I) did the Contractors consist of Japanese companies and a Korean company in addition to Philippine companies. The Japanese companies, however, canceled their contracts on grounds that security had deteriorated at the construction site. Thereafter, that construction was again submitted to bidding, and a Philippine company was awarded the contract.

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[10] This committee was discontinued under the Ramos administration.

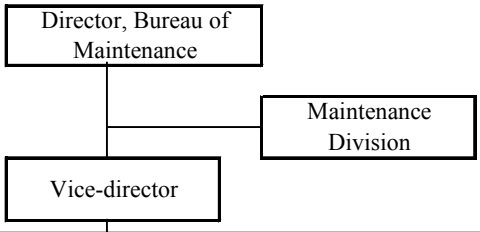
[11] "Metro Manila Radial Road No. 10 and Related Roads Project", "Metro Manila Circumferential Road No. 3 Construction Project", "West and North-West Leyte Road Improvement Project (I)".

The contracts of some of the Contractors were cancelled due to defects in process and implementation schedule management. Furthermore, there were some reports from Consultants that some contractors put in insufficient number of heavy equipment, although the matter did not go as far as contract cancellation. Furthermore, there were some cases where problems related to insufficient concrete strength due to poor quality cement, and the allowable design strength was only then assured by totally revising concrete mix design. These facts indicate that the implementation scheme of Contractors could have been improved.

2.2 Evaluation of Operation and Maintenance

2.2.1 Operation and Maintenance Scheme

The maintenance of national highways is implemented by the District Engineering Office (DEO) under the control of the Bureau of Maintenance (BOM). All roads constructed or rehabilitated under the seven projects are toll-free.



	Planning Division	Monitoring Division	Statistics Division	Inspection Division	Facilities Division
Director	1	1	1	1	1
Chief	3	3	3	3	2
Engineer	23	17	16	25	6
Others	8	4	6	3	11
Total (person)	35	25	26	32	20

Source: DPWH

Figure 3 Organization Chart of BOM and Number of Persons Assigned

2.2.2 Classification of Maintenance Work

1) Routine and periodic maintenance

The DPWH classifies maintenance as routine maintenance and periodic maintenance. The details of each category are described below.

① Routine Maintenance

It means maintenance work that is required on a daily basis, and consists of relatively simple work.

Such work consists mainly of tree care, cleaning of drainage facilities, simple repair of damaged pipes, maintenance of road shoulders, smoothing of gravel roads, filling of potholes, sealing of

cracks, repair of road markings, repair of guard rails, cleaning of road signs, but includes also other simple urgent maintenance.

② Periodic Maintenance

It includes required maintenance tasks of a larger scale and conducted on a more systematic basis than routine maintenance.

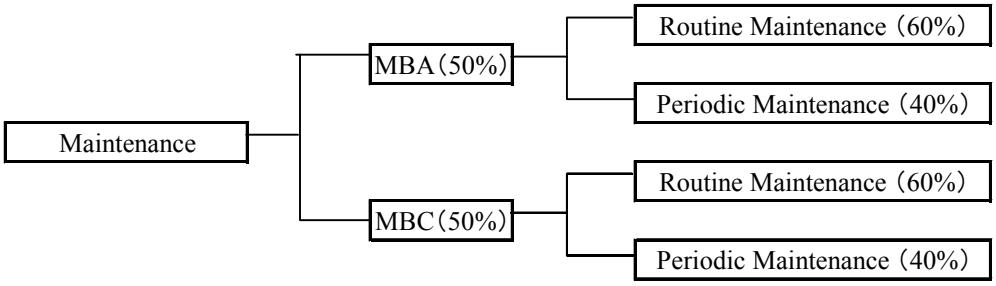
Such work consists mainly of large-scale smoothing of gravel roads, large-scale sealing of cracks in asphalt pavement, removing and replacing deteriorated wood bridge planks, repainting of steel bridges, partial resurfacing, etc.

Still the above-listed maintenance works are limited to relatively minor works, and repair work of a larger scale are implemented as new improvement/rehabilitation work by Project Management Office (PMO) using funds from the Bureau of Construction, funds from JBIC or ADB, or funds from other organizations.

Preventive maintenance is also performed as more sophisticated maintenance than periodic maintenance, using a separate budget from the normal maintenance budget. Preventive maintenance consists of tasks such as making asphalt overlays on roads currently not deteriorated and concrete rehabilitation (below continuous 4 blocks). However, preventive maintenance, for which only 600 million pesos (3,500 pesos/km) have been approved, compared to 2,100 million pesos requested by the BOM, is suffering from a severe shortage of funds.

2) Maintenance implementation system

There are two maintenance implementation systems, ① The Maintenance by Administration (MBA) system, under which the DEO uses the construction equipment of the Bureau of Equipment (BOE), and ② the Maintenance by Contract (MBC) system, under which private companies perform the maintenance work under contracts with the DPWH. The same amount of budget is appropriated to each of these systems[12]. According to the guideline, the budget appropriated to the MBA and MBC systems is to be divided into 60% for routine maintenance and 40% for periodic maintenance.



Source: DPWH

Figure 4 Maintenance Contents and Budget Distribution Guideline

[12] General Appropriation Act 1997

According to the BOM located in the DPWH headquarters, the coverage of the MBA and MBC systems is basically decided according to the condition of the road in question; under the MBA system deteriorated roads are rehabilitated, and under the MBC system only lightly deteriorated roads are maintained. The post-evaluation team requested BOM to submit objective standards for road conditions and monitoring results, but no documents clearly indicating these items were prepared.

On the other hand, according to a DEO located at one of the construction sites, the MBC is prioritized for road sections with deteriorated pavement, and the MBA is prioritized for not deteriorated road sections. The reason for this is that rehabilitation work on deteriorated roads is mostly machine dependent, bet the DPWH does not have sufficient equipment, whereas maintenance work for not deteriorated roads is rather labor intensive, so that the DEO workers can be utilized. Moreover, the post-evaluation team also requested the DEO to submit the objective criteria for road conditions and the monitoring results, but they did not have any documents or records clearly indicating these items.

The above-mentioned interview with DEO does not represent the views of all DEOs across the country since only some officers in several DEOs were interviewed. Moreover, the DPWH headquarters is not concerned in details of maintenance works as long as appropriated funds are approximately evenly shared between MBA and MBC, so that the details of the budget distribution (contents of maintenance) are left to the judgment of each DEO. At this time the budget allocation standard is not standardized among DEOs across the nation. Thus there remain unsolved questions regarding efficiency of demarcation between the MBA and the MBC accurately reflecting the actual conditions of roads.

2.2.3 Maintenance Budget & Road Condition

1) Movements in base cost and maintenance budget

Maintenance costs are calculated as the product of Equivalent Maintenance Kilometer (EMK)[13] times base cost per EMK. After this data is collected by the DPWH headquarters, budgets are allocated to each DEO. As the following table 8 shows base costs per EMK have largely remained constant since the drastic revision in 1995.

Table 8 Movements in EMK Base Cost

Unit: Peso

Year	EMK base cost	Changed to 1995 cost	1990=1.00
1990	20,500	33,600	1.00
1991	20,500	28,331	0.84
1992	28,049	35,566	1.06
1993	31,517	37,127	1.10
1994	33,500	36,180	1.08
1995	62,463	62,436	1.86
1996	63,351	58,473	1.74
1997	66,835	58,748	1.75
1998	70,511	-	-

Source: DPWH

[13] The EMK represents actual road length, road width, traffic volume, stage compositions, bridge conditions etc.

As shown in the Table 9, the movements in maintenance budgets related to national highways under the jurisdiction of the DPWH are largely parallel to that of EMK base costs.

Table 9 Movements in Maintenance Budgets of Roads

Unit: Thousand pesos

Year	Maintenance cost	Changed to 1995 cost	1990 = 1.00
1990	1,022,585	1,676,042	1.00
1991	1,020,952	1,410,956	0.84
1992	1,385,646	1,756,993	1.05
1993	1,661,377	1,957,101	1.17
1994	1,767,464	1,908,861	1.14
1995	3,237,316	3,235,917	1.93
1996	3,399,183	3,137,447	1.87
1997	3,586,099	3,152,183	1.88
1998	3,695,994	-	-

Source：DPWH

The road maintenance budget for 1998 (around 3,696 million pesos) was approximately 73% of the maintenance budget (about 5,044 million pesos) for all the infrastructure (roads, harbors, flood control, etc.) under the control of the DPWH.

2) Conditions of pavement observed at the field surveys

The field surveys conducted as part of the post-evaluation included visual checks of the conditions of pavement for all sections concerned. Although the causes of detected pavement damages were not identified, information about the overall status of the roads were thus obtained.

(1) Pavement damage status in Metro Manila

The overall condition of pavement in the Metro Manila area was good, but several cracks in the corners of concrete pavement blocks (the corners at the joints of concrete pavement) were detected. Usually, such cracks are caused by insufficient bearing capacity, poor concrete quality, or insufficient reinforcement (reinforcing bars) of corners. Generally in the Philippines, reinforcing bars are not placed in concrete pavement, so as an effective measure, reinforcing bars could be imbedded at least for corners.

Other detected damages included serial longitudinal cracks in concrete pavement at several locations along C-3 road (Metro Manila Circumferential Road No. 3 Construction Project) where canal is running in the center of the road. The cracks were approximately 3 to 8 cm wide and 30m long. Usually, such cracks are caused by uneven settlement resulting from insufficient bearing capacity of the subgrade and roadbed, or subsidence at the bankings including one-side embankings. In the case of these 7 projects, the probable cause could be that the retaining walls of the canal moved toward the center of the canal, and as a result, the roadbed sank. The exact cause, however, has not been

identified.

At the time of the survey, these cracks had not reached the stage of causing traffic safety problems. But similar damages were observed in the same canal section, and if those cracks would be left unrepaired, the traffic safety might be undermined. It is highly recommended to make an investigation of the cause(s) by experts as soon as possible, with sufficient allocation of time, personnel and budget, and to implement necessary rehabilitation promptly.

(2) Pavement damage status in the rural regions

(i) Philippine-Japan Friendship Highway Rehabilitation Project

The overall condition of pavement was good, but continuous longitudinal cracks (deformations) were detected in asphalt pavement in Gapan (around 102+000 to 103+000 km of Aritao-Sta. Rita section). The cracks were approximately 15 to 30 cm wide and 25m long. Usually, such cracks are caused by uneven settlement resulting from insufficient bearing capacity of the subgrade and roadbed, or subsidence of the banking (including one-side embankings) combined with high-temperature, high-humidity conditions, leading to liquefaction and deformation of the asphalt. In the case of this project, those sections where cracking occurred located in rice paddy area, so that these sections were embanked on both sides. In addition no drain ditch was provided along those sections, so that rainwater caused the underground water level to rise. All those factors weakened the bankings and caused lateral movement of the subgrade and roadbed.

At the time of the survey, the cracks (deformations) were already quite large. And because those sections are arterial roads, cars usually travel at high speed. Therefore, traffic safety seems to already have been impaired. It is highly recommended to have experts promptly investigate the causes, with sufficient time, budget and manpower allocated, before making immediate rehabilitations as needed.

(ii) Regional Tourism Development Roads Project

Transversal cracks were observed in the concrete pavement of the Carmona to Trece Martires section. These cracks had already been sealed so that their actual width of cracks could not be measured accurately, but the cracks occured at close intervals between 0.8 m and 2 m. Usually, such cracks are caused by insufficient thickness of the pavement, insufficient bearing capacity of the subgrade and roadbed, poor quality of concrete, improper distance between concrete joints, etc. In the case of this project, the probable cause could be that land development including the construction of plants had been progressing in surrounding areas, resulting in an increase in heavy vehicle traffic and exceeding the designed bearing capacity. Those factors were already recognized by DPWH.

(3) Establishment of pavement damage investigation committee

As previously mentioned, this survey was not aimed to determine the exact causes of damages. However, as described above, some damages from different causes were identified through the survey.

That indicates that various types of damage may occur in national highways throughout the Philippines. During the field surveys, the branches of the DPWH were queried about the causes of each crack, and the most commonly provided answer was the "increase in excessively loaded vehicles

and in general traffic volume". However, as previously mentioned, there are additional factors that may cause cracks.

The DPWH has adopted the rehabilitation method of increasing the thickness of concrete pavement as a countermeasure for the increase in load onto the roads, but this method may contribute to accelerated and increased cracking in the case uneven settlement was occurred in the layers under the roadbed. In other words, if compaction of the road sustrate had been insufficient at construction stage, increasing the thickness of the pavement can be considered to be inappropriate as a countermeasure for increased traffic weight.

In the Philippines cement concrete pavement is dominant in road construction. Generally, compared to asphalt pavement, cement concrete pavement costs more to make, but it has the merit of low maintenance cost. However, if the quality of construction could not reach a certain level, cement concrete pavement is more expensive in maintenance than asphalt pavement or steel structure. Moreover, in the case of damage that cannot be handled through usual maintenance, large scale rehabilitation will be inevitable. Thus the total cost may be higher.

Therefore, to perform effective road maintenance, it is recommended to establish a pavement damage investigation committee. This committee is supposed to cover all national highways, not limited to the roads under JBIC projects, and identify the causes of damages. Furthermore, it is ideal to give feedback of the investigation to studies which examine the desirable pavement structures for the Philippines.

(4) Preparation of standards

As part of the field survey, the post-evaluation team conducted interviews mainly on the awareness of maintenance work, and received the impression that there are not very much in common between headquarters (each bureau) and the local offices (regional offices) regarding such awareness. In order to improve this situation, ① documents including statistical data and figures on budgets, and standards and criteria, drawings, documents regarding construction procedures, etc. can be promptly prepared, ② exchange of information and personnel can be promoted, and ③ young engineers are encouraged to be given opportunities to express their own ideas through technical conferences, so as to revitalize the organization.

Also, the introduction of education programs designed to assist the above mentioned improvements would be also effective, as part of the road sector project in the Philippines financed by Japanese ODA.

2.3 Project Effects and Impacts

2.3.1 Quantitative Effects and Impacts

Under the original estimation of effects of the Projects, the following three benefit factors were assumed; ① the reduction of travel costs, ② the reduction of fixed costs, and ③ shortening travel time, and as expense factors, (1) construction costs (including land acquisition costs) and (2) maintenance costs are assumed. In this post-evaluation the assumptions were set as listed below, using actual data to calculate actual EIRR.

In this post-evaluation, the actual EIRR was calculated for a total of 12 cases which are, 5 cases of Metro Manila projects, and 7 cases in the rural areas.

1) Assumptions for actual EIRR calculation

(1) Projects in Metro Manila

- The project life was assumed 20 years from the time of the opening of the road.
- For Projects for which land was acquired, residual value of the land is accounted for at 21st year from the commencement of those Projects.
- Benefits are calculated based on the assumption that the traffic volume of the roads under the Projects increase at the same rate as the growth rate for entire Metro Manila (4.2%)[14]. However, benefits are assumed to be constant from the year when the average traffic volume for the sections under the Projects reaches the average capacity of the road.
- Costs consist only of actual construction costs, and maintenance costs are neglected since the actual amounts executed are small.

(2) Regional projects

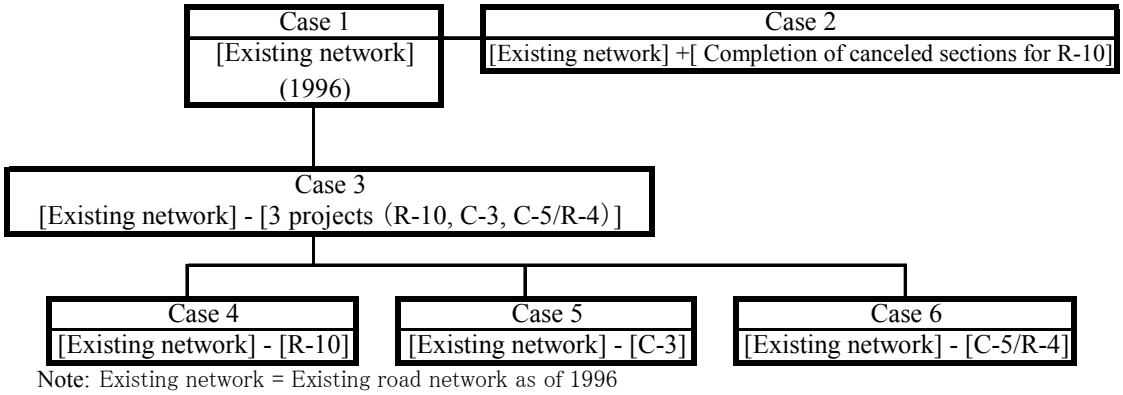
- The project life is 25 years from the time of the opening of the road for the "Philippine-Japan Friendship Highway Rehabilitation Project", and 20 years for other projects.
- Benefits are calculated based on the estimated future traffic growth obtained by applying the 1998 index for each project section.
- Costs will consist of actual construction costs plus maintenance costs calculated using the EMK for each section.

2) Benefits calculation

(1) Metro Manila projects

First, costs were calculated respectively for the three projects in Metro Manila assuming the following cases of road traffic considering that they are located in the same area.

[14] Predicted value of MMUTIS master plan



Note: Existing network = Existing road network as of 1996
R-10 = Metro Manila Radial Road No.10 and Related Roads Project
C-3 = Metro Manila Circumferential Road No.3 Construction Project
C-5/R-4 = Metro Manila Circumferential Road No.5 and Radial Road No.4 Construction Project

Figure 5 Distribution Case

Next, each case was classified into With Case (W) and Without Case (W/O), and the balance of the cost obtained using the calculation indicated in the following table were taken as benefits. Two "With Case" were set as Case 1 (existing road network as of 1996), and Case 2 (case when all planned sections of "Metro Manila Radial Road No. 10 and Related Roads Project" have been completed). As for "Without Case" cases, Case 3 to Case 6 were assumed.

Table 10 Combination of Benefit Calculation

No.	Project Name	Combination of Benefit Calculation *
MMA 1	Metro Manila Radial Road No.10 and Related Roads Project	（Case 1）-（Case 4）
MMA 2	Circumferential Road No. 3 Construction Project	（Case 1）-（Case 5）
MMA 3	Metro Manila Circumferential Road No.5 and Radial Road No.4 Construction project	（Case 1）-（Case 6）
MMA 4	Total of three projects	（Case 1）-（Case 3）
MMA 5	The case the canceled sections for R-10 were completed	（Case 2）-（Case 4）

* Cost difference in both cases

According to the statistical data in 1996, 3,388 million pesos in economic benefits were obtained annually as the total for the three projects (MMA 4 in Table 12). Of these three projects, the "Metro Manila Circumferential Road No.5 and Radial Road No. 4 Construction Project" (MMA 3 in Table 12) generated the greatest benefits, and accounted for approximately 67% of the total, followed by the "Metro Manila Radial Road No. 10 and Related Roads Project" (MMA 1 in Table 12) with approximately 22%, and the "Circumferential Road No. 3 Construction Project" (MMA 2 in Table 12) at 11%. The aggregated benefits of these three projects (approximately 3,388 million pesos) amounted to approximately 129% of the total benefits summing up those of individual project (approximately 2,625 million pesos), which indicates the existence of a synergistic effect when the three projects are combined.

Table 11 Daily Travel Cost in Metro Manila (1996)

Unit: million pesos

Case		Daily Travel Cost
Case 1	W	308.206
Case 2	W	307.827
Case 3	W/O	318.472
Case 4	W/O	309.938
Case 5	W/O	308.969
Case 6	W/O	313.664

Table 12 Economic Benefits in Metro Manila

Unit: million pesos

No.	Project Name	Per Day	One Year
MMA 1	Metro Manila Radial Road No.10 and Related Roads Project	1.732	571.56
MMA 2	Metro Manila Circumferential Road No.3 Construction Project	0.763	251.93
MMA 3	Metro Manila Circumferential Road No.5 and Radial Road No.4 Construction Project	5.458	1,801.14
MMA 4	Total of 3 projects (aggregate benefit)	10.266	3,387.84
MMA 5	The case if the cancelled sections in R-10 were implemented	2.111	696.63

Note: (MMA 1)+(MMA 2)+(MMA 3) = (571.56)+(251.93)+(1,801.14) = 2,624.63

(2) Projects in the rural regions

According to the data in 1998, as shown in the following table, the section from Calamba to Calauag of the "Philippine-Japan Friendship Highway Rehabilitation Project" generated approximately 1,044 million pesos in annual economic benefits, the highest of any projects in the rural area.

Table 13 Benefits in the Projects in Rural Regions

(Unit: million pesos)

No.	Project/section Name	Per day	One year
R 1	Laoag-Allacapan Section*	0.12	40.75
R 2	Allacapan-Aritao Section*	0.33	109.31
R 3	Aritao-Sta. Rita Section*	2.20	726.40
R 4	Calamba-Calauag Section*	3.16	1,043.57
R 5	West and North-West Leyte Road Improvement Project (I)	0.42	138.97
R 6	West and North-West Leyte Road Improvement Project (II)	0.20	65.89
R 7	Regional Tourism Development Roads Project	0.78	258.85

*: Philippine-Japan Friendship Highway Rehabilitation Project

3) Results of EIRR recalculation

Actual EIRR indicate a high degree of profitability for all the projects in Metro Manila, as indicated in the following table, which lists calculation results. For the "Metro Manila Circumferential Road No. 3 Construction Project", the EIRR came out to be worse because the actual traffic volume was lower than initially estimated, but this project still remains highly profitable[15].

For the "Metro Manila Radial Road No. 10 and Related Roads Project", the EIRR of 23.3% (MMA 5) calculated assuming the traffic volume that would result from completion of the entire project scope, is, lower than the originally estimated EIRR of 24.0 (MMA 1). The reason for this is that land acquisition costs, compared to the originally estimated 67.3 million pesos, turned out to actually be 256.6 million pesos, despite the fact that land for approximately 2,000 m of road was not acquired. This is believed to be due to a sharp rise in land acquisition costs (for the recalculation land acquisition cost was accounted for 262 million pesos, which is figured through prorating actual cost by distance).

In the rural area, excluding the "Regional Tourism Development Roads Project", the EIRR was also below the initial projection. The reason for this is that the originally estimated construction costs were largely exceeded, coupled with the fact that traffic volume turned out to be low.

Table 14 EIRR Recalculation Results

(Unit: %)

No.	Project Name/Section Name	At the time of appraisal	Actual
MMA 1	Metro Manila Radial Road No.10 and Related Roads Project	24.0	24.5
MMA 2	Circumferential Road No.3 Construction Project	120.7	30.3
MMA 3	Metro Manila Circumferential Road No.5 and Radial Road No.4 Construction Project	44.1	38.7
MMA 4	Internal rate of returns by a total of three project （=MMA 1+2+3）	-	30.5
MMA 5	It incomplete section of Radial Road No.10 Project is completed	-	23.3
R 1	Philippine-Japan Friendship Highway Laoag-Allacapan Section	18.8	6.5
R 2	Philippine-Japan Friendship Highway Allacapan-Aritao Section	30.2	15.8
R 3	Philippine-Japan Friendship Highway Aritao-Sta. Rita Section	R3 + R4	25.9
R 4	Philippine-Japan Friendship Highway Calamba-Calauag Section	= 57.7	38.0
R 5	West and North-West Leyte Road Improvement Project (I)	18.2	15.9
R 6	West and North-West Leyte Road Improvement Project (II)	16.1	7.5
R 7	Regional Tourism Development Roads Project	22.9	29.1

[15] It might be said that a road project may be economic if EIRR of about 10% can be achieved.

Table 15 Comparison of Original/Actual Construction Cost per Unit Length

(Unit: \ million/km)

No.	Project Name/Section Name	At the time of appraisal	Actual
R1	Philippine-Japan Friendship Highway Laoag-Allacapan Section	32.8	51.3
R2	Philippine-Japan Friendship Highway Allacapan-Aritao Section	24.5	62.3
R3	Philippine-Japan Friendship Highway Aritao-Sta. Rita Section	28.2	46.0
R4	Philippine-Japan Friendship Highway Calamba-Calauag Section	14.6	26.2
R5	West and North-West Leyte Road Improvement Project (I)	64.1	37.5
R6	West and North-West Leyte Road Improvement Project (II)	41.1	78.2
R7	Regional Tourism Development Roads Project	23.8	47.3

2.3.2 Qualitative Effects and Impacts

In addition to the direct benefits from the improvement and construction of roads, the following indirect effects and impacts were also obtained.

1) Reduction of damages by flooding during rainy season

For the C-3 Road, which is located on a particularly low altitude in Metro Manila, flooding during the rainy season occurred with great frequency, but the resulting damages were successfully reduced by repairing canals along with rehabilitating and building roads. Also, since the road width was expanded by underdraining the canal near the intersections, the traffic flow stabilized since the Project was implemented.

2) Improvement of convenience and efficiency to users

Public transportation (jeepneys, buses) play an important role for office and school commuters in Metro Manila. The completion of the Project reduced the number of transportation transfers for most residents. Moreover, companies offering long-distance bus services on arterial roads linking Metro Manila and the rural regions were able to cut maintenance costs for buses thanks to improvements in the condition of pavements. In addition, users of long-distance bus services can now enjoy shorter commuting times and higher comfort.

3) Easier access to public facilities and services

For residents in the rural area, the deteriorated condition of pavement prior to the implementation of the Project had made access to public facilities and services, such as schools and hospitals, difficult. However, upon completion of the Project, access to these facilities and services became easier.

3. Lessons Learned

If much progress can not be seen with the BOT-type projects, governments of developing countries, are recommended to re-examine appropriate measures, including the possibility of implementation through government budget (including the utilization of ODA funds).

BOT scheme is advantageous to the government as a measure to remedy fund insufficiencies, but on the other hand, influence of the government on project promotion lessens as the project implementation is left to a BOT contractor instead of the executing agency of the project. This may be regarded disadvantageous, as in case profitability falls in the proposed line of that BOT-type project, or in case the financial status of the BOT contractor deteriorates, the project may be placed on hold for a long time until problems are resolved.

In this way, the governments of developing countries are suggested to realize possible social losses through the delays in implementation of public projects. In case of BOT-type project which is not making enough progress, it is encouraged to study alternative measures such as possibility of implementation on the government budget. It will then require revising priorities among other government budget projects.

① 8-lane road with a median strip of Metro Manila Circumferential Road No.5 (Quezon City)

② Metro Manila Radial Road No.4 (Makati City)

③ Aurora Fly-over Metro Manila Circumferential Road No.5 (Quezon City)