The Republic of Philippines

Metro Manila Interchange Construction Project (I)(III)

Report Date: March 2001
Field Survey: September 2000

1. Project Profile and Japan's ODA Loan

Site Map: Manila, TheRepublic of the Philippines

Fly over at EDSA-Pasay

(1) Background

The Metropolitan Manila Area comprised of 4cities and 13 towns[1] in the Midwest of Luzon island, with a total area of 636km^2. The Metro area had a total of approximately 3,000km lenght of roads, with total traffic demand of approximately 11 million person-trips/day[2], excluding pedestrians transportation . Road transport covered 98% of that demand. The road development plan for the Metro area was based on the recommendations of the "Urban Transport Study for the Metropolitan Manila Area", a master plan conducted by JICA in 1973. The plan is built around 6 circumferential roads and 10 radial roads. However, the total daily drive distance exceeded 16 million drive kilometers[3], and approximately 40% of the trunk roads in the Metro area were carrying traffic volumes beyond their capacity.

(2) Objectives

Manila circumferential Road2 and 4 suffered from chronic traffic congestion and had a severe negative impact on the roadside environment. This project is to construct the interchanges at these two circumferential roads and the major radial roads, in order to improve the road transport functions of the Metro Manila area and promote more effective urban development.

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1 At the time of the appraisal, the Metro area included four cities, Manila, Quezon, Pasay and Karukan, and the 13 towns of Mandaruyon, Makati, Marabon, San Juan, Passig, Pateros, Tagige, Monterupa, Marikina, Nabotas, Las Pinas, Balenzuela and Paranyake.

2 This is the unit for expressing the movement behavior of one person with one objective. For example, a person who leaves home to commute to work, walks to the station, boards a train, changes from the train to a bus, alights from the bus near the workplace and walks to the work place has made one person-trip.

3 One vehicle which travels 1km produces 1 vehicle-km. (For instance, One hundred vehicles traveling 10km produce 1,000 vehicle-km. Ten vehicles traveling 100km produce 1,000 vehicle-km.)

(3)Project Scope

Package A:
Construction of a two-level grade interchange between EDSA (Circumferential Road 4) Pasay Road andAyala Avenue .

Package B:
Construction of a three-level grade interchange between Nagtahan (Circumferential Road 2) and Magsaysay Boulevard (Radial Road 6).

The ODA loan covered the whole of the foreign currency portion and a part of the local currency portion of the project cost.

(4) Borrower/Executing Agency

Republic of the Philippines / Department of Public Works and Highways (DPWH)

(5) Outline of Loan Agreement

Metro Manila Interchange Construction Project (I)

Loan Amount/Loan Disbursed Amount	¥2,304 million / ¥2,276 million
Exchange of Notes/Loan Agreement	October 1989 / February 1990
Terms and Conditions	Interest rate: 2.7%, Repayment period: 30 years (10 years for grace period), General Untied
Final Disbursement Date	May 1998

Metro Manila Interchange Construction Project (III)

Loan Amount/Loan Disbursed Amount	¥2,872 million / ¥1,815 million
Exchange of Notes/Loan Agreement	July 1995 / August 1995
Terms and Conditions	Interest rate: 2.7% (Consulting service: 2.3%), Repayment period: 30 years (10 years for grace period), General Untied
Final Disbursement Date	June 2000

2. Results and Evaluation

(1) Relevance

The project was intended to alleviate the constant congestion within the main roads network of Metropolitan Manila Area at the junctions of EDSA-Pasay and Ayala Avenue and at the Nagtahan – Magsaysay Boulevard road intersection, which are the intersections between Circumferential Roads 2 and 4 and major radial roads. The improvement of road sector in Philippine was in line with the country's medium-term development plan (1987-1992), at the time of the appraisal. The locations concerned were causing intense traffic congestion at the time of the appraisal, and there was an urgent need for countermeasures.

In the transport mode of Philippines today, road transport is used for approximately 89% of all

passenger movements (as of 2000). Alleviation of congestion on major roads in the Metro Manila area is one of the targets stated in the current medium-term development plan (1999-2004). Road transport is enormously important in the Metro area, and in the project locations, and the implementation of the project plan was appropriate.

(2) Efficiency

Of the two multi-level interchanges, Package B was designated by the Aquino administration as a fast-tracked project for the alleviation of extraordinary traffic congestion. Construction began early (May 1991) and was completed by March 1992, ten months ahead of the scheduled two-year construction period.

The start of construction for Package A was delayed for a long period, partly because a new design concept was required that would take into account the construction of the LRT No.3 line[4], which was not anticipated at the time of the appraisal. These factors caused a cost overrun which necessitated a supplementary ODA loan (Metro Manila Interchange Construction Project (III): loan agreement signed in August 1995) for the continuation of construction. As a result, construction of Package A began in January 1997, and completion was delayed until July 2000.

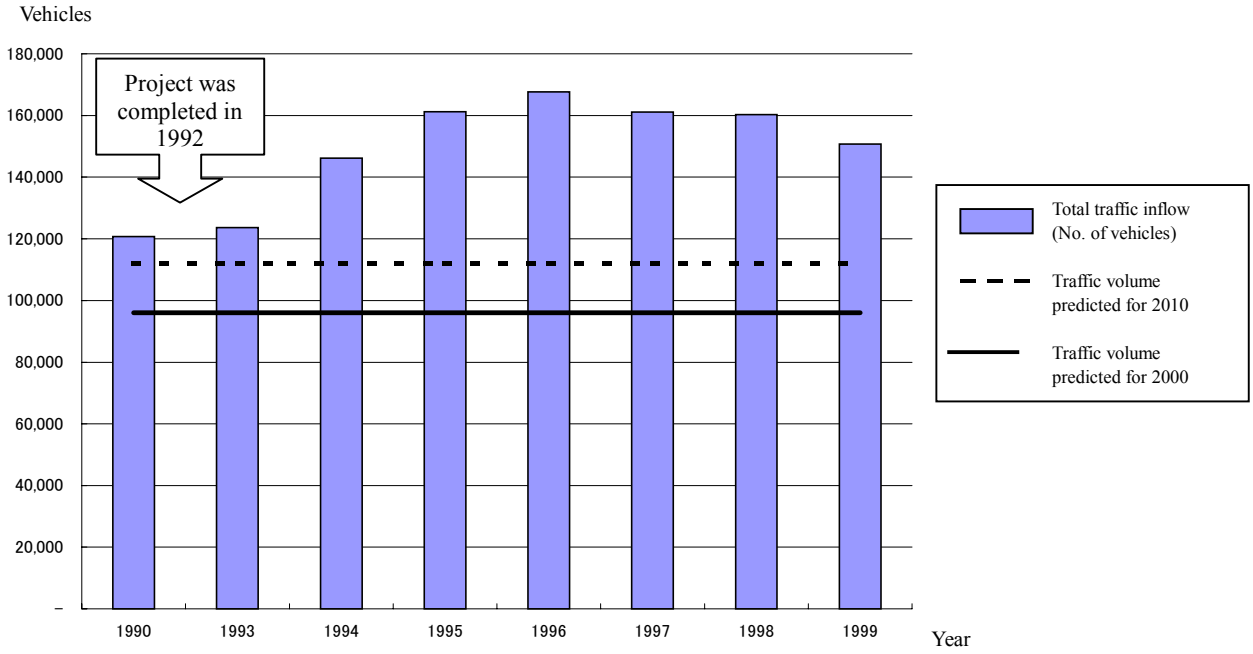
(3) Effectiveness

(i) Changes in traffic volume

Figure 1 shows traffic volumes from 1990, before the implementation of the project for Package B until the present (the latest recorded figures are for 1999). After the project was implemented, the traffic volume increased more than before the project to far exceed the volume predicted at the time of the appraisal in 1989. The number of registered vehicles in Metropolitan Manila Area approximately doubled during the '90s, indicating that project at this junction was effective in handling the explosive growth of traffic volume.

[4] LRT = Light Rail Transit.

Figure 1: Total Traffic volume Entering the Nagtahan – Magsaysay Multi-level Interchange (vehicles/day)



Source: DPWH Traffic Engineering Center (TEC) material
Note: There is no data for 1991 and 1992.

The total traffic inflow for the EDSA – Pasay and EDSA – Ayala multi-level interchange is as shown in Table 1. The forecast for 2000, based on the traffic volume before the implementation of the project, was 106,000 vehicles/day (EDSA – Pasay) and 88,000 vehicles (EDSA – Ayala). The actual figures for 2000, after the implementation of the project, were 135,322 and 130,039 respectively, exceeding the forecasts in each case. This situation indicates that the project is effective in handling the increase in traffic volume.

Table 1 Total Traffic volume Entering EDSA-Pasay, EDSAAyala Interchange

Point	2000	
EDSA-Pasay Interchange	Predicted number	106,000
	Actual number	135,322
EDSA-Ayara Interchange	Predicted number	88,000
	Actualnumber	130,039

Source: Predicted number: JBIC material, actualnumber: DPWH's data

(ii) Alleviation of congestion

A separate impact study (Impact Study on JBIC's Transport Projects in Metro Manila) has been conducted for this project[5]. That study included the findings from interviews with road users (98 users of this project were interviewed), in which 80% responded that their travel times had become shorter.

Calculating waiting times at each of the project sites reveals that both the EDSA – Pasay – Ayala

[5] "Impact Study on JBIC's Transportation Projects in Metro Manila" January, 2001.

interchange and the Nagtahan – Magsaysay interchange improved enormously from F[6] to B[7] in the National Research Council's standards.

Judging by the above results, we can conclude that the project made a contribution to alleviating congestion.

(iii) Economic Internal Rate of Return (EIRR)

The impact study re-calculated Economic Internal Rate of Return (EIRR) as 17.2% for the project, according to the assumptions below.

Benefit: Savings in travel time and cost.
Cost: Investment cost + maintenance cost (3% of investment cost).
Project life: 20 years.

(4) Impact

(i) Improvement in urban road transport functions

The interview survey[8] of road users concerning this project showed that the proportion responding that accessibility (general ease of movement from a given point) had improved was low. However, approximately 50% of road users responded that the flow of traffic (congestion) had improved, and approximately 60% responded that the overall traffic situation had improved. Thus around half of the road users interviewed felt, from the evidence of their own eyes, that the project had exerted some influence to improve the situation.

Available data was not adequate to allow comparison of numbers of traffic accident before and after the implementation of the packages of this project. However, approximately 70% of road users interviewed in the survey responded that the incidence of accidents at the intersection had fallen.

(ii) Impact on environment

The impact study performed a simulation to gauge the impact on air pollution in 2015 for cases in which the project was, or was not implemented. The results showed that values for CO, CO_2, NOx, SOx and SPM (Suspended Particulate Matter) were all lower for the case in which the project was implemented.

Interviews with road users for the same study found that approximately 60% of respondents asked about air pollution said air pollution was worse than it had been before. On noise, approximately 40% said noise was worse, approximately 40% said it was better and the remainder said there had been no impact.

Considering the increase in traffic volumes using the intersections involved in this project, it would be difficult for road users to get the impression that air pollution and noise had improved. That appears to be what emerged in the results of the interview survey. On the other hand, the simulation conducted in the impact survey showed that, compared to the case where the project was not implemented, traffic flowed

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6 Where each car takes 60s or more, as shown in Highway Capacity Manual (Transportation Research Board, National Research Council 1985)

7 Where each car takes 5.1~15s or more, as shown in Highway Capacity Manual (Transportation Research Board, National Research Council 1985)

8 From the same impact study.

more smoothly through the intersections built under the project, resulting in a reduced value of base exhaust gas unit, which varies with vehicle speed, and reduced volume of exhaust gas emissions. The simulation result indicates that the project was effective in restraining the future increase of air pollution.

(iii) Technology transfer

This project built multi-level interchanges, which require advanced and complicated technology. In particular, the EDSA interchange applied special design and construction techniques to the construction of the tunnel. That kind of construction was almost unprecedented in the Philippines, which suggests that the project had the effect of transferring technology to those involved in the project on the Philippines side.

(5) Sustainability

(i) Organization and operation

The Bureau of Maintenance (BOM) is responsible for preparing maintenance-related plans and budgets, while the actual maintenance work is handled by the National Capital Region (NCR). The NCR has seven district offices, of which the North Metro Manila District Engineering Office (NMED) is responsible for the Nagtahan – Magsaysay interchange and the Second Metro Manila District Engineering Office (SMED) is responsible for the EDSA – Pasay – Ayala interchange.

The maintenance work is divided into work carried out by private companies through Maintenance By Contract (MBC) and work carried out directly by the NBC through Maintenance By Administration (MBA). Work under contracts to private companies previously amounted to 50% of the total maintenance budget for ordinary daily maintenance, but that share has risen to 70% in recent years. The remaining 30% of the budget is used by the NCR for work carried out by its own district offices. The target for the future is to raise to 85% the proportion of the budget used for maintenance by contract.

The process of privatizing road maintenance by increasing the share contracted out to private companies is commendable. For the portion the BOM handles for itself, the organization of district offices includes a number of engineers and there is an adequate budget for hiring contract workers, calculated working plans. Therefore there is apparently no serious problem in staffing in this area either. The preparation and implementation of detailed maintenance plans are left to the district office. Monitoring and checking by DPWH of the status of maintenance implementation by each district office is important for ensuring the quality of that maintenance work, and the monitoring system must be strengthened. At the time of the study, the DPWH had no collated data on the status of maintenance implementation by the district offices. However, the BOM within the main DPWH Headquarters checks the condition of roads and bridges. The checks had previously been carried out at half-yearly intervals, but they are now quarterly. Table 2 shows the situation over the last five years.

The proportion of roads and bridges in “good” condition declined between 1998 and 1999, while the proportion in “fair” condition increased. In 2000 the proportion rated “good” rose again. Now if the proportion of roads and bridges under direct NCR jurisdiction rated “fair” is not kept within 15%, or if the proportion of all roads under NCR jurisdiction rated “poor” is not kept within 5%, a warning is issued by the DPWH through the director of the NCR. A roads and bridges database has been built[9] and is kept

[9] Examples include the Road Information and Management Support System (RIMSS), which began in April 1997 as Technical Assistance (TA) from the World Bank. RIMSS II began in July 2000.

updated with World Bank assistance, and it is used for centralized management as part of a gradual effort for improvement.

Table 2: State of Roads and Bridges under NCR Jurisdiction

Year	1996	1997	1998	1999	2000
Good	66.1%	69.2%	48.3%	56.5%	77.0%
Fair	26.2%	26.8%	45.4%	36.3%	16.5%
Poor	0.8%	1.2%	3.8%	1.5%	0.4%

Source: DPWH and BOM documents. Figures for each year are from the final inspection of that year.
Note: Good, fair and poor ratings are defined according to the following:
Guidelines published in 1996,97 –Department Order No.76 August 30, 1988
Guidelines published in 1998, 99 –Department Order No.179 August 22, 1997
2000 -D.O. No.31,s,2000 Administrative Sanction
Totals may not add to 100% because some roads undergoing rehabilitation cannot be rated.

(ii) Budget

Table 3 shows the movements in the NCR's maintenance costs (for ordinary maintenance) between 1996 and 2000. These maintenance costs are calculated as the product of the base unit cost (calculated to reflect rising prices) per EMK (Equivalent Maintenance Kilometrage)[10] by the EMK for roads and bridges. The disbursed budgets fell in 1997 and 1998 but began rising again from 2000.

Table 3 NCR's Actual Maintenance Cost

Unit: million peso

Year	1995	1996	1997	1998	1999	2000
Maintenance Cost	157.8	162.7	171.7	149.8	164.7	179.9

Source: DPWH NCR data

The above maintenance costs are largely covered by payments from the initially planned annual budget, and in recent years there have been no problems with major delays in the disbursement of budgets.

However, the above allocation alone does not have sufficient leeway to deal swiftly with unexpected road rehabilitation needs. A calamity fund to provide some degree of budget for accidents and other emergency situations has been set up, but it would not necessarily be sufficient to deal with major disasters. That is cause for concern as the Philippines is geographically prone to typhoons.

Within a limited budget there is a tendency for projects such as this, which have not been completed for very long, to be given a low priority in budget allocations. The EDSA – Pasay – Ayala interchange built under this project has only just been completed, and the Nagtahan – Magsaysay interchange was completed eight years ago. No significant problems can be observed in either at present. However, if maintenance budget calculation and implementation continue to be carried out under the current system, there is uncertainty over whether or not quick action could be taken if the need for major rehabilitation arose. The new system using the above-mentioned assistance by World Bank should help to improve the situation by identifying problems early and taking action.

[10] EMK is an index based on road paving type, width and traffic volume to be used in calculating maintenance costs.

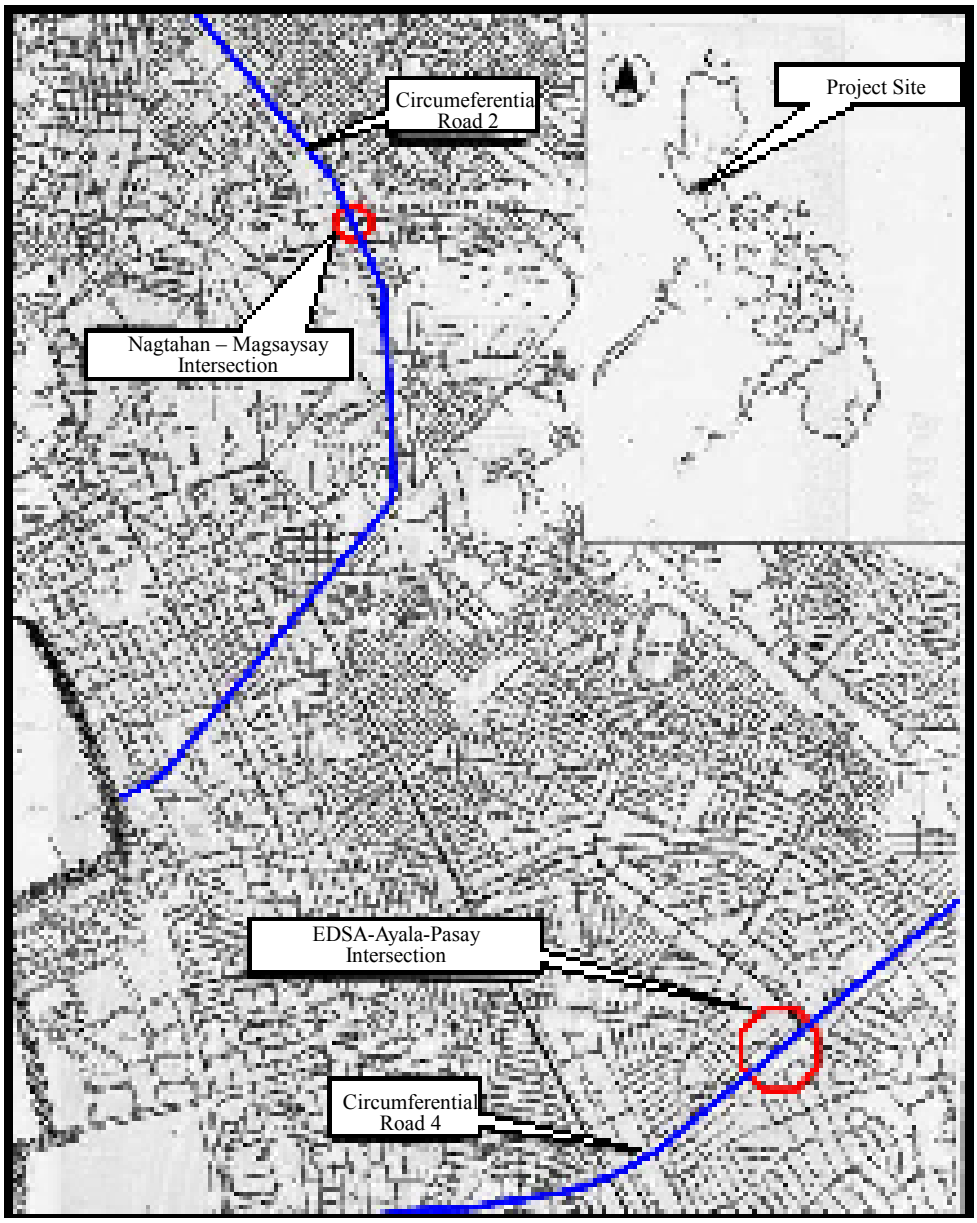
Comparison of Original and Actual Scope

Item	Plan	Actual	
① Project Scope			
-Civil works	A. EDSA/Pasay road and Ayala road intersection two-level interchange facility	(Same as left)	
	B. Nagtahan/R.M.Magsaysay road intersection three-level interchange facility	(Same as left)	
-Land acquisition etc.	Land acquisition etc.	(Same as left)	
-Consulting service	Detailed design review, construction supervision, preparation of traffic control plan etc.	(Same as left)	
②Implementation Schedule	Feb. 1990 ~ Mar. 1994	A. Mar. 1995 ~ Jul. 2000 B. Feb. 1990 ~ May 1992	
③Project Cost		Package B Actual	Package A Actual[1)]
Foreign currency	¥1,371 million	¥1,324 million	N.A.
Local currency	¥1,701 million	¥273 million	N.A.
Total	¥3,072 million	¥1,597 million	¥2,601 million
ODA Loan portion	¥2,304 million	¥1,198 million	
Exchange rate	1 peso ＝ ¥6.2	1 peso ＝ ¥6.2	1 peso ＝ ¥3.0

Note:

1) Package A was completed in July 2000. It includes portion covered by the supplementary ODA loan.
The table includes figures from DPWH documents on this project submitted in November 1998 and estimated figures for the portions of Package A covered by the supplementary ODA loan.
The LRT No.3 line appears to be functioned effectively.

Metro Manila Interchange Construction Project (I) (III)
Project Site Map



Source: JBIC materials