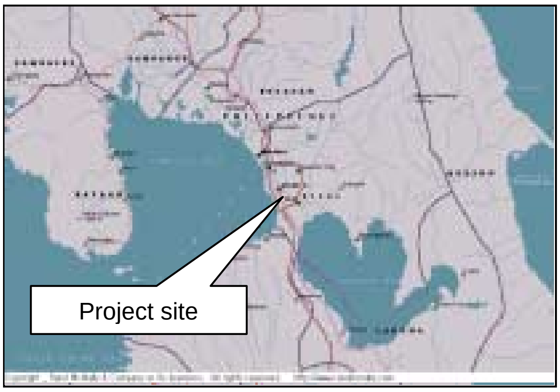
Philippines

Metro Manila Interchange Construction Project (II)

Report date: March 2001
Field survey: September 2000

1. Project Profile and Japan's ODA Loan



Site Map: Metropolitan Manila in the Republic of the Philippines

Fly over at EDSA and Shaw Boulevard

1.1. Background

Metro Manila located in the mid-western part of Luzon Island comprised of 4 cities and 13 towns[1] and occupies an area of 636 km^2. The metropolitan area had a total road length of approximately 3,000 km. Traffic demand, excluding pedestrian traffic, was worth 11 million person-trips[2]/day, and in terms of modes of transport, 98% of such demand was met by roads. Road improvement plans for the metropolitan area had been implemented with a focus on the improvement of six ring roads and ten radial roads in accordance with the recommendations included in the master plan entitled "Urban Transport Study for the Metropolitan Manila Area, which was conducted by the Japan International Cooperation Agency (JICA) in 1973. However, the total daily distance covered by vehicles exceeded 16 million unit-kilometers[3], and the traffic volume for approximately 40% of the main trunk roads in the metropolitan area had exceeded their capacity.

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[1] At the time of appraisal, the four cities were Manila, Quezon, Pasay and Caloocan, and the 13 towns were Mandaluyong, Makati, Malabon, San Juan, Pasig, Pateros, Tagig, Muntinlupa, Marikina, Navotas, Las Pinas, Valenzuela and Parañaque.

[2] A person-trip is a unit that indicates the action of moving by a person for a specific purpose. For example, the entire action of moving for the purpose of commuting to the office, including the walk from house to a station, taking a train and getting off at a station, taking a bus from the station to the bus stop nearest the office and walking to the office, which represents one person-trip.

[3] A distance of 1 km traveled by 1 vehicle = 1 unit-kilometer. For example, 100 vehicles traveling a distance of 10 kilometers each = 1,000 unit-kilometers, and 10 vehicles traveling a distance of 100 kilometers each = 1,000 unit-kilometers.

1.2. Objectives

The objective of the project was to introduce a two-level crossing system at intersections between Circumferential Road No. 4 (C-4) and major radial roads, which were prone to chronic congestion and were also adversely affecting the surrounding environment via air and noise pollution, thereby improving the road transport functions of the metropolitan area and thus promoting effective urban development.

1.3. Project Scope

The Project consisted of the construction of a two-level crossing system at the EDSA-Shaw and EDSA-Boni intersections.
Japan's ODA loan covered the entire foreign currency portion of the project and part of the local currency portion.

1.4. Borrower/Executing Agency

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

1.5. Outline of Loan Agreement

Loan amount/Loan disbursed amount	¥1,663 million/¥1,512 million
Exchange of notes/Loan agreement	March 1991/July 1991
Terms and conditions	Interest Rate: 2.7%, Repayment Period (Grace Period): 30 years (10 years), General untied
Final disbursement date	October 1998

2. Results and Evaluation

2.1. Relevance

The objective of the project was to introduce a two-level crossing system at the constantly congested EDSA-Shaw and EDSA-Boni intersections with the aim of reducing chronic traffic congestion. EDSA is considered the most important avenue of the major road transport system in metropolitan Manila. The improvement of the road sector was in line with the Philippine government's Medium-term Development Plan (1987-1992), and the implementation of the project was considered relevant.
A look at passenger movement in the Philippines indicates that even today, road transport accounts for approximately 89% of passenger movement (based on figures for 2000). Furthermore, the government's Medium-term Development Plan (1999-2004) cites the reduction of traffic congestion on major roads in the metropolitan area as one of its future goals. Road transport in the metropolitan area and at the two intersections is extremely important, and therefore, the relevance of the project continues to be maintained.

2.2. Efficiency

The entire project was completed a little over two years behind schedule. The major reasons were changes made in the designs for the two-level crossing system at the two intersections, including those related to the LRT[4] Line No. 3 at the EDSA-Shaw intersection; right-of-way (ROW) problems; and the necessity for the relocation of public facilities such as water pipes and telephone lines. As the project addressed these problems, the construction work for the EDSA-Shaw two-level crossing system was completed in two years and four months compared to the three years and two months initially planned, and that for the EDSA-Boni system was completed in two years and nine months compared to the one year and five months initially planned. The total project cost overran initial estimates by approximately 10%.

The executing agency was the Urban Road Projects Office (URPO) of DPWH. URPO has abundant experience not only in Japan's ODA loan projects but also in those financed by the World Bank, Asian Development Bank (ADB) and other aid organizations. It took appropriate measures for the project, including compensation for the landowners and local residents who were affected by the project, and the construction of bypasses and other necessary facilities during the construction period.

2.3. Effectiveness

(2.3.1.) Changes in Traffic Volume

The traffic volumes for both two-level crossing systems (units/day) are as shown in Table 1. The traffic volume at the intersections changed during the period from 1996 to 1997 after the EDSA-Boni two-level crossing system was completed. The traffic volume for EDSA decreased while the underpass for Boni Avenue, which enabled traffic flow, saw increased traffic. The flyover constructed at the EDSA-Shaw two-level crossing system carries Shaw Boulevard over EDSA, and during the post-project period after 1998, as expected, the traffic volume for EDSA declined while that for Shaw Boulevard grew.

Changes occurred in the flow of traffic after project completion, with the volume of traffic on EDSA decreasing, thus improving traffic conditions at the two intersections.

[4] LRT stands for Light Rail Transit.

Table 1 Traffic Volumes for the Two-Level Crossing Systems (Units/day)

(Predictions)

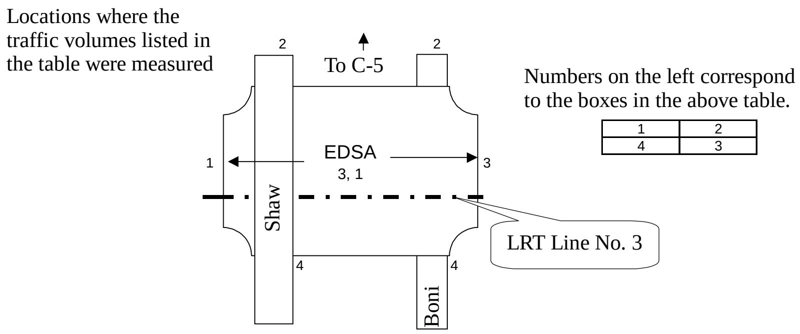
Intersection	2000		2010	
EDSA/Shaw Boulevard	121,201	72,244	139,904	78,565
	53,890	161,107	58,901	180,824
EDSA/Boni Avenue	161,107	2,123	180,824	6,899
	162,178	18,845	23,794	186,373

EDSA-Boni two-level crossing system completed November 1995

EDSA-Shaw two-level crossing system completed June 1998

(Actual results)

Intersection	1994		1995		1996		1997		1998		1999	
EDSA/Shaw Boulevard	N.A.	56,581	197,320	33,430	171,590	56,490	171,590	37,340	128,615	64,055	117,265	68,630
	48,856	178,340	45,690	235,080	52,230	218,660	52,230	142,305	47,075	118,890	48,560	119,950
EDSA/Boni Avenue	178,340	n.a.	235,080	n.a.	218,660	14,545	142,305	47,935	118,890	47,800	119,950	N.A.
	21,940	176,962	45,300	n.a.	40,460	225,770	36,900	178,590	43,990	N.A.	N.A.	N.A.



Source: Predictions and actual results have been prepared using JBIC materials and DPWH TEC materials, respectively.

Furthermore, LRT Line No. 3 is currently operated above EDSA, and if the project had not been implemented, LRT Line No. 3 would not have coexisted with EDSA-Shaw Boulevard and EDSA-Boni Avenue. For this reason, the implementation of the project constituted the major prerequisite for the realization of the elevated railway line and has been highly significant.

(2.3.2.) Reduced Congestion

A separate impact study (Comprehensive Impact Assessment of Metropolitan Manila) was conducted in connection with the project[5]. The results of interviews with road users conducted during this study (12 persons for the project) indicated that all interviewees replied that the traveling time had increased. One of the reasons cited was that the construction of the two-level crossing system forced road users to detour.

In addition, the impact study calculated the volume capacity ratio (V/C ratio)[6] for the case in which the project was not implemented and that in which it was implemented. A look at the results of calculations for the area affected by the project indicates that the V/C ratio was 1.1 for the case in which the project was not

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

[6] The V/C ratio is an indicator of the degree of congestion on a road. It is expressed as the ratio of traffic volume for a road to its capacity. A V/C ratio of 1.0 means that the traffic volume for a road is equal to its capacity. A higher V/C ratio represents a higher level of congestion.

implemented and 1.1 for the case in which it was implemented, which demonstrated there to be no difference in the ratio between the two cases.

The results of simulative calculations in the impact study revealed, however, that the average delay time for the EDSA-Shaw intersection (seconds/unit) was 0.3 for the case in which the project was implemented and 2.0 for that in which it was not, which suggests that the traffic flow has been remarkably improved. However, the area around the EDSA-Shaw intersection is developing rapidly and a new circular route scheme has been introduced. This has changed the flow of traffic in and around the area resulting in the failure to elucidate data on improvements in congestion and traveling time in the project area.

(2.3.3.) Economic Internal Rate of Return (EIRR)

In the impact study, the EIRR was recalculated based on the preconditions specified below. The result was 33.4%.

Benefits: Reductions in travel cost and time
Cost: Investment costs + maintenance costs (3% of investment costs)
Project life: 20 years

2.4. Impact

(2.4.1.) Improvement of Urban Road Transport Functions

The results of the road user interview survey[7] indicated that the percentage who replied that overall accessibility (ease with which they can move from one point to another) had improved was low. Some 50% replied, however, that the flow of traffic (congestion) had become smoother, and some 60% stated that traffic conditions had improved. These replies demonstrate that nearly half of all road users had the impression that the project had had some positive effects in improving traffic conditions (order of traffic flow (whether traffic flow is favorable)).

With respect to the number of traffic accidents, the impact study compared pre- and post-project data. The results revealed that the number of accidents at the EDSA-Shaw intersection had declined since 1998, when the project was completed. Although the number of accidents at the EDSA-Boni intersection increased sharply in 1996, immediately after project completion, it continued to decline in subsequent years. More than 80% of respondents in the road user interview survey stated that the number of accidents at the intersections had decreased.

If comprehensive consideration is given to the results described above, it is concluded that the project made a substantial contribution to improving transport functions in the metropolitan area, and specifically to increased safety due to the decreased number of traffic accidents.

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

(2.4.2.) Environmental Impact

The impact study simulated the possible different effects of the project on air pollution in 2015 for the case in which the project was implemented and that in which it was not implemented. The results indicated that figures were lower for all simulation items (carbon monoxide, carbon dioxide, nitrogen oxides, sulfur oxides and suspended particulate matter), for the case in which the project was implemented.

Meanwhile, more than half of those interviewed replied that air pollution was worse than before. Responses were divided on the question of noise pollution, with slightly more people indicating that the phenomenon had worsened.

Given the remarkable increase in traffic volume at the project intersections in recent years, it would be difficult for road users to have the impression that such conditions had improved. This is shown in the results of interviews. The results of the simulation, however, indicated that the project helped ease the flow of traffic, thus reducing the per unit volume of exhaust gas, which varies according to speed. This reduced exhaust gas emissions, which has put a halt to future progression of air pollution.

(2.4.3.) Revitalization of the Economy in Surrounding Areas

According to the executing agency’s report, the project had positive effects on the living conditions in the surrounding communities, with improvements in the flow of traffic being specifically highlighted. The report also indicated that land prices in surrounding areas had risen.

On the other hand, few respondents in the road user interview survey stated that the project had had effects on the surrounding areas, such as improved employment and accessibility to new livelihoods, improved quality of life and more dynamic economic activity, though half of all interviewees replied that the project had facilitated the transport of merchandise.

The results described above suggest that the project is contributing to facilitating the transport of merchandise in the economic sector.

(2.4.4.) Technology Transfer

Since the project involved the construction of two-level crossing systems that require two types of advanced technology (overpasses and underpasses), it generated the effect of transferring technology to the local engineers involved in the project.

2.5. Sustainability

(2.5.1.) Organization and Management

The Bureau of Maintenance (BOM) is responsible for work related to planning and budgeting for maintenance, and the National Capital Region (NCR) is engaged in work related to actual maintenance. In addition, the NCR has seven district offices, with the First Metro Manila District Engineering Office (FMED) being responsible for the two-level crossing systems built under the project.

Maintenance work consists of two parts: the portion that is contracted out to private businesses (maintenance by contract or MBC) and that which is performed by NCR itself (maintenance by administration or MBA). Previously, 50% of the routine maintenance covered by total operation and maintenance budgets was contracted out to private businesses but this has increased to 70% in recent years. Currently, the remaining 30% of the budget is used for work performed by the district offices under the control of NCR. The goal is to raise the percentage of MBC to 85% in the future.

Raising the percentage of road maintenance consigned to the private sector will promote privatization, which is favorably evaluated. For the remaining MBA portion, several engineers are earmarked for each district office and budgets for contracted workers are allocated based on work plans. There are no serious problems with personnel shortages in this area.

The development and implementation of detailed maintenance plans is entrusted to each district office. How the head office of the DPWH checks and monitors the maintenance conducted by each district office is important for ensuring quality at the local level, and it is necessary to strengthen this system of checking and monitoring. When the field study was conducted, the head office of the DPWH did not have systemized data on the status of maintenance performed by each district office. The condition of roads and bridges, however, is inspected by the BOM at the head office of the DPWH, and such inspections, which were conducted semiannually in the past, are currently being done quarterly. Table 2 shows the condition of roads and bridges for the past five years.

During the period from 1998 to 1999, the percentage of “good” roads and bridges decreased and that of “fair” ones increased, but in 2000, that of “good” ones again increased. At present, if the percentage of “fair” roads and bridges is not maintained under 15%, and that of “poor” roads under 5%, the DPWH issues a warning to the district office involved through the director of the NCR. With the support of the World Bank, databases of roads and bridges are being constructed[8], updated and centrally controlled, indicating that efforts to improve the system are gradually being advanced.

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[8] Examples include the Road Information and Management Support System (RIMSS) initiated in April 1997 as part of the World Bank’s Technical Assistance program. RIMSS II started in July 2000.

Table 2 Condition of NCR-controlled Roads and Bridges

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 BOM materials. Figures for each year represent values that were obtained from the last inspection conducted in the year.

Note: The definitions of "good," "fair" and "poor" are based on the standards specified below.
1996/97: Guidelines included in Department Order No. 76, August 30, 1988
1998/99: Guidelines included in Department Order No. 179, August 22, 1997
2000: Administrative sanctions included in Department Order No. 31, s, 2000
The reason the total of figures for the year does not equal 100% is that some roads, including those that were being rehabilitated, were not rated.

(2.5.2.) Budget

The changes in NCR maintenance costs (for ordinary maintenance) for the period from 1996 to 2000 are as shown in Table 3. These costs are calculated by multiplying one unit of Equivalent Maintenance Kilometerage (EMK)[9] for roads and bridges by basic unit prices (annual price hikes and other determinants are factored into calculations). Although the budgets decreased in 1997 and 1998, the amount was again increased in 2000.

Table 3 Actual NCR Maintenance Costs

Unit: One million pesos

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

Source: DPWH NCR materials

The operation and maintenance costs listed above are largely financed from within the initially planned annual budgets, and it seems that in recent years, there have been no problems, such as major delays in this aspect of budget execution.

It is considered, however, that the NCR cannot afford to respond to unforeseen road repair needs with the currently allocated budgets alone. Although a certain amount of emergency budgets for disasters and other events has been secured in the form of the Calamity Fund, it would not necessarily be enough if a large-scale disaster were to occur, and there is some concern about this situation in the Philippines, a country that is geographically prone to be hit by typhoons.

Against a background of limited budgets, there is a tendency for projects like the present project, which have been recently completed, to be given low priority in budgetary allocation. Recently completed visual inspections of the project

[9] This is an index for calculating costs, which is determined by the type of surface, road width and traffic volumes.

intersections has revealed no major problems at this time. If the current system of budgetary allocation remains unchanged, it is uncertain whether swift measures can be taken if large-scale repair work needs to be performed in the future. It is hoped that the overall situation will be improved by, for example, using the new World Bank-funded system mentioned above for early identification of problems and the implementation of countermeasures.

Comparison of Original and Actual Results

Item	Plan	Results
1. Project scope · Civil engineering work	A. EDSA/Shaw two-level crossing system Two-bridge flyover method B. EDSA/Boni two-level crossing system Concrete Rahmen-structure bridge (overpass)	 Single-bridge flyover method Cut and cover Tunnel structure l (underpass)
· Consulting services	Detailed design review, assistance in bidding, supervision of construction work, etc.	Same as left
· Land acquisition, etc.	Land acquisition	
2. Implementation schedule	February 1991 to February 1996 (61 months)	February 1992 to June 1998 (76 months)
3. Project cost		(Note)
Foreign currency	¥674 million	¥1,329 million
Local currency	227 million pesos	231 million pesos
Total	¥2.218 billion	¥2,437 million
ODA loan portion	¥1.663 million	¥1,512 million
Exchange rate	PHP1.00 = ¥6.80	PHP1.00 = ¥4.00

(Note) The actual project cost is based on the report compiled by the DPWH in January 1999. The project cost quoted in foreign currency includes the cost quoted in peso, which was covered by Japan's ODA loan.