Philippines

Metro Manila Road Pavement Rehabilitation Project

Report date: March 2001
Field survey: September 2000

1. Project Profile and Japan's ODA Loan

Site Map: Metropolitan Manila, the Republic of the Philippines

Elliptical Road

1.1. Background

Metro Manila located in the mid-western part of Luzon Island consists of four 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, and traffic demand, excluding pedestrian traffic, grew at an annual rate of about 4.5% during the ten-year period from 1980 to 1989 (approximately 10 million person-trips[2]/day in 1980 and approximately 16 million person-trips/day in 1989). By mode of transport, 98% of the traffic demand was met by roads. Accordingly, approximately 40% of the roads in the area were overcrowded and those to the east of EDSA Avenue[3] (Circumferential Road No. 4 (C-4)) carried increasingly heavy traffic and suffered from growing traffic congestion. Under these circumstances, the surface of main trunk roads was damaged and broken in many locations, which caused obstacles to traffic and reduced the number of effective traffic lanes. According to the Department of Public Works and Highways (DPWH), various cases of damage and breakage had been confirmed on the major roads. Examples included wheel tracks and depressions on roadways, the softening of hard shoulders and sidewalks as well as gouged ditches, and damaged drainage

[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] EDSA stands for Epifanio delos Santos Avenue, which takes its name from a Supreme Court Judge in the 1930s.

facilities. In addition, traffic congestion was having significant effects on the surrounding environment, including air pollution and noise.

1.2. Objectives

As the surface of major roads in metropolitan Manila was heavily damaged and the soil under the roads had softened significantly due to increasing traffic volumes and other factors, the project aims to repair the surface of the roads and to repair and improve drainage facilities, thereby improving the road traffic functions of the metropolitan area and promoting further urban development.

1.3. Project Scope

The project covered the eastern half of the area inside EDSA Avenue and the C-5. Repairs to road surfaces, drainage facilities, hard shoulders and foot paths were implemented for a total of 57km of main roads within the area, where flood prevention measures had been implemented.

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	¥1,795 million/¥1,258 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	September 1998

2. Results and Evaluation

2.1. Relevance

Priority roads inside EDSA Avenue and the C-5 in metropolitan Manila were selected as the project area. The objectives of the project were to repair and improve these roads and thereby improve the road traffic functions of the metropolitan area. These objectives were relevant to the goal of improving the road network in the area, which was included in the country's Medium-term Development Plan (1987-1992).

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), which demonstrates that road transport remains a highly important mode of transport. Furthermore, the country's Medium-term Development Plan (1999-2004)

cites reduction of traffic congestion on the main roads in the metropolitan area as one of its future goals, thus the project continues to be relevant.

2.2. Efficiency

The entire project was completed a little over three years behind schedule. The reason for the delay was the change made to the project roads, including the exclusion of V. Mapa Street-P. Sanchez Street-Shaw Boulevard-Pasig Boulevard and South Avenue, and the inclusion of A. Bonifacio Drive for the APEC summit meeting in 1998, and this necessitated design changes and other procedures. The construction period, however, was three years and seven months, only three months longer than initially planned.

The project cost was within the initial budget by approximately 35%, the main reason being the reduction in the length of project roads (approximately 40%) due to the changes made to initial plans. The extended construction period, however, increased consulting service costs by a little over 20%.

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. The government agency took appropriate measures for the present project, including the establishment of a technical examination committee aimed at solving problems related to underground facilities, the spraying of water to prevent dust during construction and the installation of sound-proof walls for noise control.

2.3. Effectiveness

(2.3.1.) Changes in Traffic Volume

The overall traffic volume for the project roads exceeded initial demand predictions and is significantly larger on the Granada/Ortigas Avenue, Elliptical Road, Bonifacio Drive and other major radial roads. A separately conducted impact study (Comprehensive Impact Assessment of Metropolitan Manila)[4] revealed that the traffic volume for the project roads had increased sharply as compared to the pre-project period. The number of vehicles registered in metropolitan Manila almost doubled during the 1990s, and the project has responded effectively to the increase in traffic volume during the decade.

Table 1 Traffic Volume for Project Roads (vehicles/day)

Category	1998	1999
Demand predictions	363,000	368,445
Actual results	511,390	562,510

Source: DPWH

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

(2.3.2.) Reduction of Traffic Congestion

Interviews with road users conducted in the impact study (295 persons for the present project) indicated that nearly half of respondents believed that travel times had been reduced. Moreover, half of them replied that the flow of traffic had become smoother.

In addition, the impact study calculated the volume capacity ratio (V/C ratio)[5] 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 1.07 for the case in which the project was not implemented and 1.04 for the case in which it was implemented, demonstrating that roads are less congested for the case in which the project was implemented.

Given the results described above, it can be said that the project, together with related projects, contributed to a reduction in traffic congestion.

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

In the impact study, the EIRR was recalculated based on the preconditions specified below. The results of recalculation showed an extremely high EIRR, at 92.5%, largely due to the greater than expected increase in traffic volume.

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

2.4. Impact

(2.4.1.) Improvement of Urban Traffic Functions

Although it was not possible to examine the changes in the number of traffic accidents in relation to the project, the results of interviews with road users in the impact study (295 persons for the project) showed that nearly half of respondents stated that the number of accidents had decreased. Some 60% of interviewees replied that traffic conditions had worsened overall. As mentioned earlier, the flow of traffic (congestion) undoubtedly improved for the case in which the project was implemented as compared to that in which it was not implemented. Due to the considerable growth in traffic volume in recent years, however, the general impression of road users is that it is difficult to perceive an improvement in the traffic condition.

(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

[5] 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.

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.

For example, on-site observation data obtained by measuring the condition of air pollution and noise along Kalayaan Avenue, one of the project roads, in May 2000 are as shown below. With respect to air pollution, all figures except those for suspended particulate matter were lower than the standards set by the Department of Energy and Natural Resources (DENR).

Table 2 Condition of Air Pollution at Kalayaan Avenue Intersection of the C-5

Unit: μg/Ncm

Measurement time	Suspended particulate matter	Sulfur dioxide	Nitrogen dioxide	Noise (unit: dBA)
9:00AM	488.9	27.5	31.5	77
12:20PM	320.9	67.0	24.3	75
7:30PM	914.1	114.5	48.2	77
DENR standards	300	340	260	70

Source: DPWH

Approximately 80% of those interviewed in the survey of road users replied that air pollution and noise levels were worse than before.

Given the remarkable increase in traffic volume on the project roads 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, as compared to the case in which the project was not implemented, 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 the Area along the Road

Approximately 40% of respondents in the interviews with road users stated that the project had had positive effects on employment and that it had provided access to new livelihoods. Some 20% replied that the project had facilitated the transport of merchandise while about 50% replied that the project had contributed to a higher quality of life. Some 50% answered that the project had generated a spurt in business activities.

The results described above suggest that the project has also made certain contributions to the revitalization of the economy in the project area.

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, NCR has seven district offices and the respective offices responsible for the present project conduct maintenance work in the project area.

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 3 shows the condition of roads and bridges for the past five years.

Table 3 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.

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[6], updated and centrally controlled, indicating that efforts to improve the system are gradually being advanced.

(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 4. These costs are calculated by multiplying one unit of EMK(Equivalent Maintenance Kilometerage[7]) 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 4 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. Visual inspection of the project roads has revealed no major

[6] 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.

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

problems at the present moment. 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	Nine project roads	Changes made to project roads, but
· Resurfacing	Total length: 57 km	number unchanged at nine
· Drainage facilities		Total length: 34.18 km
· Hard shoulders, etc.		
· Consulting services	Detailed design, supervision of construction and confirmation work for the project roads	Same as left
2. Implementation schedule	July 1991 to May 1995 (43 months)	January 1992 to August 1998 (69 months)
3. Project cost		(Note)
Foreign currency	¥1,073 million	¥1,218 million
Local currency	87 million pesos	77 million pesos
Total	¥2,393 million	¥1,566 million
ODA loan portion	¥1,795 million	¥1,218 million
Exchange rate	PHP1.00 = ¥6.80	PHP1.00 = ¥4.00

(Note) Based on DPWH materials prepared in 1999